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INFLUENCING ENTREE SELECTION AT THE POINT-OF-PURCHASE IN A MILITARY CAFETERIA.

By

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ABSTRACT

Objective This study assessed the effectiveness of an Air Force point of purchase nutrition labeling program (The "Check it Out" program) in influencing sales of targeted entrees. The degree of perceived influence that certain factors such as taste, appearance, fat content, calorie content, price, and quality had on meal selections also was measured.

Design A Quasi-experimental design was utilized to compare sales of targeted entrée items between a one year baseline period and two 30 day post intervention periods. The intervention materials and displays were in place for one week prior to recording post-intervention sales data. A period of 30 days separated the first intervention period from the second. A survey utilizing semantic scales (1= no influence to 7= extremely influential) was used to measure the perceived influence of the aforementioned factors on meal selections.

Subjects/setting The Fort Riley Main Post Dining Facility, in Junction City, Kansas, served as the site of the study. One hundred, forty nine active duty military personnel, chosen by convenience sampling completed the survey.

Intervention The promotional materials and displays associated with the "Check it Out" (CIO) program included large posters, bearing the CIO label, (strategically placed within the serving areas), and nutrient display cards (placed in front of the corresponding entrée) which included the fat, calorie, and cholesterol content of the entree. Once implemented, these materials were left in place for the duration of the study period.

Outcome measures The mean sales of targeted entrees as well as the proportion of targeted entrée to total entrée sales were used to compare pre- and post-intervention sales periods. Comparisons of the factors influencing meal selections were performed based on mean scores.

Statistical analysis One-way analysis of variance (ANOVA) was used to detect significant differences between the baseline and post-intervention sales data. ANOVA was also used to detect differences in mean scores given to the influential factors based on age, rank, sex, and payment method. Paired-sample t-tests were used to compare mean scores given to the influential factors within a like demographic category. During the paired-sample tests, the Bonferroni procedure was used to calculate the required significance level, in order to reduce experiment-wide error.

Results No significant differences in sales of targeted entrée items were detected between the baseline and two intervention periods. Respondents rated the factors of taste, appearance, and quality significantly more influential to meal selection than calorie content, fat content, and price ($P<.000$).

Applications/conclusions The results of this study suggest that a marketing campaign focusing on the health attributes of targeted entrée items was not successful in boosting

sales of these items among the population studied. A better approach might be to design a campaign which focuses on the taste, quality, and appearance of the food items. The findings of this study may be of particular interest to organizations or clinicians who desire to influence the meal habits of certain populations or individuals.

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Chapter 1

Introduction

The health risks associated with obesity are well known. A 1996 study performed by Galuska, Serdula, Pamuk, Siegel, & Byers indicated that during the period 1987 to 1993 the prevalence of overweight among American adults increased by five percent. The increasing linear trend was observed in all subgroups of the population. Noonan (1995) provided data indicating that children appear to be following a similar trend. Jensen and Rogers (1998) acknowledged the lack of specific obesity guidelines for the elderly, however, these authors concluded that obesity prevalence is rising among this age group as well. Solomon and Manson (1997) revealed that at least one-third of all Americans remain obese. Obesity was defined by a body weight greater than or equal to 120 percent of ideal. According to Jensen and Rogers (1998), one in two adult Americans are now classified as overweight. Russell, Williamson, & Byers (1995) reported that the Healthy People 2000 goal to reduce the prevalence of overweight among those between the ages of 20 to 74 to no more than 20 percent will not be reached based on the observed increasing trend in obesity. The authors concluded that prevention of weight gain among individuals not currently obese would substantially slow the rise in obesity prevalence (Russell et al., 1995).

Preventive measures aimed at slowing the rise in obesity would undoubtedly be more successful if directed at those areas where consumers most frequently purchase food items. Grocery outlets and dining establishments arguably provide the greatest exposure to foods.

A recent survey released in 1998 by the National Restaurant Association (NRA) indicated that Americans are spending greater proportions of their food dollar on food away from home. In 1994 the average annual household expenditure was $1698 while in 1995 it was $1702, an increase of 0.2 percent. In light of this trend, one may effectively argue that nutrition education efforts directed at the retail level of food consumption would be a logical intervention.

Results of an extensive two-part survey conducted by the National Restaurant Association revealed that restaurant customers are becoming more nutrition-conscious with their food selections (Attitudes toward nutrition in restaurants: assessing the market, 1990). The survey also indicated that those customers most likely to remain unconcerned with nutrition issues were male, aged 18 to 24 years, single, with average income. Consumers most likely to be concerned with nutrition issues were female, aged 35 to 54 years, with high income.

Extensive research has been conducted regarding the influence of point-of-choice nutrition labeling on customer meal selections. These studies will be discussed in the Review of Literature Chapter. The work of Dalton, Linke, and Simko (1986), Granzin and Bahn (1988), Albright, Flora, and Fortmann (1990), Green, Steer, Maluk, Mahaffey, and Muhajarine (1993), Caserez, Lee, Jacob, Lee, and Medora (1994), Perlmutter and Gregoire (1997), and Glanz, Basil, Maibach, Goldberg, and Snyder (1998), suggested that factors such as taste and value may have a greater influence on final meal selection than health attributes. These data suggest that changing consumer behaviors without addressing these factors will be challenging.

Statement of Problem

The Department of Defense (DOD) has instituted strict weight standards for all of its active duty troops. Air Force Manual (AFMAN) 1-1 VOL II suggests that overweight members may be unable to carry out the military readiness mission as effectively as possible. Therefore, it is paramount that all members be within allowable weight or body fat standards. Air Force Instruction (AFI) 40-502, "Weight Management Program", outlines the maximum allowable weight for heights for both males and females. If a member is overweight, a body fat measurement is taken. If the body fat level is within allowable limits, as set forth by AFI 40-502, then the member is still considered within allowable standards. It is the responsibility of the active duty member to maintain a body weight or body fat level consistent with these standards. If a member fails both the weight for height and body fat tests, they immediately are entered into the weight management program. If the member fails to demonstrate adequate progress on three consecutive (30 day) follow up periods, action is implemented that could cost the member his or her military career.

The cost of weight related discharges is substantial. According to the DOD Pharmacoeconomic Center (PEC) update there were 4,273 enlisted members separated from the military during the 1995 fiscal year because of obesity (Bureau of Naval Personnel [PERS-60], personal communication, February 14, 1997). The average cost to recruit, train, and replace these active duty members was estimated to be approximately $40,000 per member. The combined overall cost for replacement of those members discharged in 1995 was estimated to be approximately $169 million (Bureau of Naval Personnel [PERS-60], personal communication, February 14, 1997). Results from the

1995 DOD Survey of Health Related Behaviors showed that 11.9 to 22.6 percent of active duty members (stratified for age group) were overweight or obese.

To assist active duty members with maintaining acceptable body composition, and ultimately to help reduce weight related discharges, efforts have been made to provide nutrition labeling at the point of purchase within base dining facilities. The intent is to influence members to choose those foods which provide the highest health value. Such food selections might then contribute to the optimum health and body composition of military troops.

The U.S. Air Force launched such a nutrition labeling campaign in November of 1992. Termed the "Check it Out" program, this nutrition marketing campaign was developed by the Air Force Nutrition Committee in conjunction with commercial marketing contractors and was implemented in more than 1000 dining facilities across 105 Air Force bases. The "Check it Out" program emphasizes low-fat, nutritious foods, and brings attention to the importance of exercise. The program utilizes eye-catching red lightning bolts, table tents, menu boards, stationary, and steamtable nutrition labels to convey healthy messages to dining customers. Although substantial research regarding the effects of nutrition labeling protocols have been conducted in the civilian setting, no objective data exist pertaining to the effectiveness of nutrition labeling efforts in influencing behavior change among active duty military members frequenting base dining facilities. Specifically, no objective data exist regarding the effectiveness of the "Check it Out" program among its target consumer.

Purpose

The purpose of this study was to investigate the influence of a point-of-choice nutrition labeling program (The "Check it Out" program) on entrée selections and to determine the extent of influence that certain factors such as taste, appearance, price, calorie content, fat content and quality are perceived to have on entrée selections among active duty military members frequenting a base dining facility.

Objectives

The specific objectives of this study were to:

- Quantify the extent of influence that taste, appearance, calorie and fat content, price, and quality have on entrée selections among active duty military personnel in a military dining facility.
- Observe the influence of a point-of-choice nutrition information protocol (the "Check it Out" program) on selections of entrée items with less than 15 grams of fat and less than 100 milligrams of cholesterol.
- Determine other factors which may influence military personnel entrée selections.

Hypotheses

Based on the review of literature, the following hypotheses were tested:

H1: The point of purchase nutrition labeling program will not have a significant impact on selections of targeted entree items among active duty military personnel.

H2: Taste, quality, price, and appearance will have a higher degree of perceived influence on entrée selections than calorie and fat content among active duty military personnel aged 24 or less.

H3: Price will have the highest degree of perceived influence on entrée selection among those military personnel who must pay cash for their meals.

Limitations and Delimitations

The study focused primarily on an active duty military population within a base dining facility. This population was dominated by young (18-31 year old) males. Therefore, inferences regarding the larger, and more diverse civilian population may be limited. An additional limitation may arise from the study of just a single military dining facility. However, given the relative homogeneity of the population frequenting military dining facilities, the results obtained from the targeted site may still provide valid conclusions about other military populations.

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Chapter 2

Review of Literature

Trends in Consumer Behavior

According to Thomas Kershaw, chairman of the board of the National Restaurant Association, "Consumer spending in the restaurant industry is projected to exceed $336.4 billion in 1998" (Restaurant Spending Consumer Expenditure Survey, 1998). The National Restaurant Association's spending survey also reported that in 1995 approximately 48.4 percent of the total food dollar in households earning greater than $70,000 per year was spent on food away from home. For households earning between $30,000 and $39,999 this figure was 38.3 percent of the total food dollar. These data support the generalization that as household income increases the proportion of the food dollar allocated to food purchases away from home also increases.

The National Restaurant Association's *Tableservice Trends-1997* reported that approximately 40 percent of all adults indicated that restaurant meals are "essential" to their lifestyles. This figure was consistent across several levels of income. The report also established that approximately one-half of Americans are cooking fewer meals at home than they did in 1995 (Tableservice Trends-1997, 1997).

Guthrie and Lin (1997) also presented additional evidence that Americans are eating more and more meals away from home. According to the U.S. Department of Agriculture's nationwide food consumption surveys conducted in 1977-1978 and 1995, food eaten away from home by Americans aged two years and older nearly doubled from 19 percent to 36 percent of total daily caloric consumption (Guthrie and Lin, 1997).

Consumers have verbalized an increased concern for the nutritional content of the foods being consumed. McMahon (1995) presented data indicating that the number of Americans who said they had made changes in their diet related to fat content increased nearly 70 percent from 1992 to 1994. Straus (1994) contradicted this observation and reported that while consumers may "say" they are changing their dietary habits to meet low-fat recommendations, their actual food selections may not be reflective of their stated intentions. Data from the 1993 American Dietetic Association's Survey of American Dietary Habits determined that although 50 percent of the respondents claimed to monitor fat intake and 46 percent claimed to monitor cholesterol intake, only six percent of the respondents could accurately state what the dietary fat guidelines were and essentially none of the respondents could state the dietary cholesterol guidelines (Straus, 1994). This finding is not surprising, as according to Schacter (1983), self-assessments of knowledge may not always mirror actual knowledge levels.

Evidence such as this suggests that consumers have begun to take positive steps toward healthful dietary changes; however, they may still need additional information to achieve optimal dietary goals. Since more Americans are eating away from home, it would appear most logical to provide appropriate nutrition information at those sites being visited. Warshaw (1993) maintained that to effectively educate consumers about dining out, the information should be provided in the actual restaurant setting. Warshaw stated that this approach would result in greater knowledge retention and would serve to demonstrate the consumer's interest in nutrition information to the restaurant owner.

Restaurant Response to Customer Needs

Restaurant managers have responded to the nutritional needs of customers by providing lower fat entrees, side items, and condiments as well as nutrition information about the menu (Carlson and Tabacchi, 1986; Regan, 1987; Regan, 1989). Challenges were immediately evident regarding which nutrition information formats and what information would be most helpful and best accepted by customers (Carlson and Tabacchi, 1986). Initial liaisons between chefs and dietitians to develop low-fat, yet tasteful cuisine appeared to be quite successful and profitable; however, these efforts have been limited in number (Regan, 1987). According to Sneed (1991), restaurant managers may be exhibiting increased receptivity toward the use of registered dietitians in the planning and promotion of healthful menu items.

Use of promotional campaigns to target low-fat offerings has increased within the restaurant setting (Ryan, 1986). Ryan's 1986 article highlighted the nutrition campaigns of 37 different restaurants. Clay, Emenheiser, and Bruce (1995) surveyed product research and development directors of 309 major restaurant chains in the U.S. The authors found that these restaurant chains planned to continue to emphasize the nutritional aspects of their menus. The data from Ryan (1986) and Clay et al. (1995) suggested that a substantial number of restaurant owners were willing to answer the needs of their customers by providing desired nutritional information.

Roadblocks to Nutrition Labeling

Although consumer demand appears high, not all restaurant owners were convinced that healthful menu items were selling. Certain restaurant owners complained

that sales of healthy fare were not in line with what was anticipated based on prior survey data (Benson, 1995). The high cost of spoilage resulting from lack of sales of fresh produce was an additional concern of many Canadian restaurant owners (Benson, 1995). According to research conducted by Gilmore, Huss, and Sapp (1997) such complaints may be founded. The authors received surveys from 274 midwestern restaurant customers. The survey was designed to determine if eating behavior differed between home and the restaurant. The authors found that unexplainable differences in eating behavior did exist. The authors concluded that the respondents appeared to "throw caution to the wind" when dining away from home.

In an effort to gain insight into other reasons why restaurant owners may be unwilling to serve or promote healthy fare, Almanza, Nelson, and Chai (1997) submitted a formal survey to 68 research and development directors from among the largest food service corporations in the United States. Respondents cited reasons such as: sales of targeted items would be negative, lack of appropriate training for personnel, and difficulties updating menus to reflect nutrition information as key deterrents to offering healthful fare.

Legislative Issues

Concerns to provide customers with accurate, non-misleading, and easily applicable nutrition information have been and continue to be of top priority among regulating bodies (Earl, Porter, and Wellman, 1990). These concerns led to the passage of the Nutrition Labeling and Education Act (NLEA) of 1990. However, the act did not specifically address restaurants and soon concern grew that health claims within restaurants were increasingly inaccurate or misleading (Boger, 1995).

Recently, The Center for Science in the Public Interest (CSPI) pushed aggressively for legislation that would force restaurants to substantiate all nutritional claims made on their food products (Bryant, 1997). A U.S. District Court ruling contended that the Nutrition Labeling and Education Act of 1990 did apply to restaurants. Although the Food and Drug Administration (FDA) rules required restaurants to meet the established definitions of specific health claims, restaurants would not be required to provide complete nutrient analysis of its products or to have them tested by laboratory analysis to ensure accuracy of posted nutritional content (Bryant, 1997).

The new ruling has been opposed by those within the restaurant industry (Glanz, Rudd, Mullis, and Snyder 1989; Boger, 1995). Opponents to the rule contest that it would serve to discourage restaurant owners from continuing with or instituting new nutritional campaigns for fear of not complying with FDA regulations (Glanz, et al. 1989; Boger, 1995). Several key problems that would be faced by restaurants attempting to comply with the FDA rules were highlighted by Boger (1995). Of prime consideration was the cost required to reprint menus. Boger indicated that some facilities may be required to have separate breakfast, lunch, and dinner menus. The cost for this upgrade could be substantial. Portion sizes pose another dilemma for restaurants. Boger emphasized that most nutrition guidelines for meats are based on 3.5 ounce servings. This serving size would not be practical for most restaurants. Boger (1995) further emphasized that it would be impractical to label the standard fare as two servings. Additionally, attempting to serve consistent portion sizes within the restaurant setting would most certainly be a daunting task that is not faced by the packaged food industry, upon which the original FDA guidelines were intended (Boger 1995). The predominant

fear shared by restaurant industry experts appeared to be those associated with increased costs, risk for lawsuits or fines, and the need to bring existing programs into FDA compliance. Restaurant owners may find it "safer" and more convenient to simply not offer nutrition information at all (Glanz, et al. 1989; Warshaw, 1993; Boger, 1995).

Point of Purchase Labeling

Much effort has been directed and continues to be directed at the problem of finding the most effective method for providing accurate and reliable nutrition information at the point-of-purchase to the customer. The goal of any nutrition intervention program should be to provide adequate information so that customers may choose food items which provide optimum health benefit. Many researchers have reported that despite offering healthful food items and appropriate nutrition information, not all customers desire to select the healthy food (Glanz, et al. 1989; Straus, 1994; McMahon, 1995). Work conducted by Hunt, et al. (1997) revealed that education, age, and gender were most closely associated with food choice behaviors that reflect recommendations to reduce dietary fat and increase fruit and vegetable consumption. Consumers that have more education, are older, and female were found to have the highest compliance with the above dietary recommendations.

Incentive-Based Protocols

Different methodologies have been used to study various point-of-purchase nutrition information protocols. Several studies utilized a game or incentive format for delivering the nutrition information. Zifferblatt, Wibur, and Pinsky (1980) examined the

impact of a nutrition awareness game, *"Food For Thought"*, on employee food selections at a National Institutes of Health cafeteria. The game was designed to encourage employee customers to select lower calorie foods during the lunch meal and was implemented for eight weeks following a baseline measurement period. Data regarding food and total calorie selection were evaluated using a time series analysis. Purchases of skim milk increased significantly, while dessert and bread purchases declined significantly. Purchases of other food categories were not significantly changed from baseline levels. Total calories purchased per person per day also declined significantly during the intervention. A ten week follow-up observation period revealed that purchases had not changed significantly since the time the intervention ended, suggesting continued impact from the intervention protocol (Zifferblatt, Wilbur, and Pinsky, 1980).

Cincirpini (1984) examined the effects of three different intervention techniques on meal selections in a university cafeteria. Subjects were primarily undergraduate students aged 18 to 23. A total of 5,542 observations were taken unobtrusively over a 16 month period following the placement and retrieval of each of the intervention protocols. Baseline observations were recorded for each intervention prior to its implementation. The three interventions utilized were caloric feedback, labeling, and token system. Caloric feedback entailed the use of two large signs which listed all available menu items along with their caloric composition. The labeling strategy utilized green triangles to designate low-calorie, low-fat foods. Leaflets were distributed during the first ten days of the strategy to encourage selection. The token system provided cash rebates ($1.00) upon purchase of a minimum of the green triangle labeled foods. Observation results indicated that the caloric feedback system was associated with decreased carbohydrate, red meat,

and dairy consumption. The labeling system produced isolated effects on vegetable, soup, and fruit consumption. The authors reported that the token system produced the most uniform changes in food selections and positively affected purchases of salads, vegetables, low-fat dairy goods, and low-fat meats. The selections of high-fat dessert items and sauces decreased during the same time period (Cincirpini, 1984).

Mayer, Brown, M.A.T., Heins, and Bishop (1987) combined three strategies to disseminate nutrition information in a worksite cafeteria. Individual food labels, a nutrition awareness game, and a raffle-based incentive system were implemented for a four week period immediately following a four week baseline sales measurement period. An additional four-week observation period followed the termination of the intervention protocols. The target population was approximately 67 percent female with mean age of 46. No statistical differences were found in total calories selected between the initial baseline, intervention, or follow-up periods. The authors reported an increase in selection of individual food items targeted by the raffle system followed by a subsequent decrease when the raffle was terminated. Surveys conducted with the cafeteria customers revealed that the majority had appreciated the nutrition information systems and desired that they be reinstalled. Despite the favorable acceptance of the nutrition information initiatives by customers, the authors were forced to conclude that in the cafeteria studied, these measures did not succeed in reducing total calories per tray.

Non-Incentive Based Protocols

A larger majority of the studies observing the effects of labeling protocols in restaurants and cafeterias did not use tangible, incentive-type strategies. Instead, the

intangible health benefits of a low-fat diet were emphasized. Dubbert, Johnson, Schlundt, and Montague (1984) selected an urban cafeteria for a study designed to influence customer food purchases by posting information regarding the relative caloric content of targeted items. The customer population was approximately 55 percent female and 45 percent male. Three food categories: entrees, vegetables, and salads were selected for labeling. At each observation session the three lowest calorie containing foods within each group were labeled using a three by five inch, brightly colored card that indicated the item was a lower calorie selection (exact caloric content was not provided to the customers). Sales data were collected from a computerized cash register system before, during, and after the implementation of the labeling protocol. Observation periods were conducted each Tuesday evening for 15 total periods (three observations per phase). Linear logistic regression analysis was utilized to compute the overall effects of labeling and food type on the probability of choosing a labeled item. The labeling protocol was associated with a significant increases in the probability of selecting a labeled vegetable or salad, however, there was no significant increase in the probability of selecting a labeled entrée. These findings were consistent with those from the Zifferblatt et al. (1980) study.

In 1985, Davis-Chervin, Rogers, and Clark utilized nutrition education signs and nutrient display cards to attempt to influence student food purchases in two university cafeterias. The signs provided information regarding disease risk factors, recommendations for dietary modification, and examples of such dietary modification. The display cards provided calorie, cholesterol, and percent of calories from fat for all targeted items. A multiple baseline design was used in each facility. Both the nutrition

sign and nutrient display cards were used in the first cafeteria, while only the nutrient display cards were used in the second cafeteria. Time-series analysis revealed that food selection was significantly influenced in the first cafeteria but not in the second. The authors hypothesized that the additional information provided in the first cafeteria was at least partially responsible for the increased selections of targeted menu items (Davis-Chervin, et al. 1985).

Mayer et al. (1986) used a multiple baseline design to evaluate the effects of a nutrition labeling intervention on the selection rate of targeted low fat entrees in an urban, family-owned cafeteria. The clientele included equal proportions of male and females. Observations of food selections were conducted on Tuesday, Wednesday, and Thursday evenings during the dinner meal (4:45-7:00 pm). The duration of the study was for nine weeks and included a total of 24 observation sessions. The intervention consisted of a large promotional poster which presented a rationale for a low-fat diet, recommendations for making dietary changes, and a list of the low-fat entrees available for the particular meal. Smaller posters indicating the low-fat entrée choices were placed at the entrée section of the serving line. The mean fat content of all low-fat entrees available during the study was 6.8 grams. All nutritional analyses were conducted by a registered dietitian. In addition to entrée selection, the purchase rate of desserts was monitored. Results indicated that the proportion of low-fat entrees sold increased significantly during each of the two intervention phases. The purchase rate of desserts remained unchanged throughout all phases of the study. The authors concluded that the nutritional prompts were effective in increasing the selection rates of targeted entrée items (Mayer et al, 1986).

Schmitz and Fielding (1986) utilized a slightly different format for presenting nutrition information. A comparison-type labeling protocol was used to observe changes in total calorie, sodium, fat, and cholesterol composition of employee meals in the worksite cafeteria of a large toy corporation. The intervention consisted of nutritional comparisons of two food items within like categories. The information cards were then displayed throughout the cafeteria at the corresponding location of the labeled foods. Approximately 1,250 customers visited the cafeteria each day for lunch. Every tenth employee to pass the cashier was chosen for recording of meal selections. Data were collected for a six day period prior to implementation of the intervention and for another six day period after the intervention had been in place for six months. The results indicated that total calories and sodium decreased significantly from baseline levels. A decrease in fat was observed but did not reach a significant level. No difference between baseline and post-intervention was observed for cholesterol. The authors concluded that point-of-choice nutrition labeling can influence customer selections (Schmitz and Fielding, 1986).

In another study by Colby, Elder, Peterson, Kniseley, and Carleton (1987), entrée selections in a family-style restaurant were observed for changes induced by the possible influence of promotional messages. Three different messages were applied on an equal basis to three different entrees. The first message indicated that the entrée was healthful. The second message emphasized the healthfulness and flavor of the food item. The third message was non-specific and simply indicated that the entrée was the special of the day. The intervention period lasted 27 days. The messages were displayed during the lunch session on Tuesdays, Wednesdays, and Thursdays. Sales data among the three entrees

were analyzed using chi square analysis to determine significant differences in sales between the three different messages. The authors found that the taste-health message produced a statistically greater number of sales of the healthy entrees than did the health only and non-specific messages. Manipulation check cards were administered to 277 customers to determine if the customers were able to remember specific characteristics of the messages. Data gathered indicated that taste was the most important criterion considered when making the entrée selection. The authors concluded that customers in this study were more receptive to information emphasizing the taste of an entrée than its healthfulness (Colby, et al. 1987).

Additional evaluation of the effects of point-of purchase nutrition information on customer selections was conducted by Forster-Coull and Gillis in 1988. The protocol, promoted as "*To Your Heart's Delight*", was implemented in 21 downtown Halifax restaurants, during the lunchtime period. Three facilities dropped out of the program prior to completion. Customers were surveyed before the intervention messages were placed (n = 163) and after completion of the program (n = 106). Restaurants were given heart stickers (which could be fixed onto the menu beside the targeted selection), menu inserts, or table tents, based on which format participating restaurants felt would best serve their establishment. All menu analyses was performed by a panel of food and nutrition specialists. "Tip Sheets" were developed for the waitstaff to assist with menu explanations. The intervention materials were in place for six weeks. Analysis of survey data revealed a significant increase in the number of customers reporting that they had chosen a heart healthy selection after program implementation as compared to baseline.

The authors concluded that the intervention program was successful in influencing customer selections (Forster-Coull and Gillis,1988).

Wagner and Winet (1988) utilized large posters, photographs, and table tents to promote salad selections at a fast food restaurant near a university location. An identical facility, in a neighboring city with similar population demographics served as a control. A multiple baseline design measured salad sales before and after two implementation periods (each was one week in length) of the intervention materials. The menu was identical at both facility locations. Computerized sales data were examined to determine if sales of salad as a percentage of total sales increased above baseline during the intervention periods. The authors reported that salad sales increased during the promotional prompting, then decreased when the prompts were removed. It was concluded that the promotional materials did result in an increase of salad sales in the facility examined (Wagner and Winet,1988).

Anderson and Haas (1990) developed a menu-oriented nutrition education program termed, *"Dine to Your Heart's Delight"*. The program utilized heart decals (placed on the menu) and table tents to promote menu items that met the specified nutritional parameters. Qualifying parameters emphasized trimming all visible fat from meat and poultry, use of polyunsaturated oils, use of low-fat dairy products and broth-based soups, and preparation methods other than frying. A total of 53 restaurants were involved in the study, representing fast food, cafeteria, and table-dining facilities. Sales data were collected for a two-week period prior to implementation and for four weeks after implementation. Of the 58 menu items that qualified for labeling, 52 items experienced increased sales, four items remained unchanged, and two items had

decreased sales. Statistical significance of these findings was not indicated (Anderson and Haas,1990).

Albright, Flora, and Fortmann (1990) chose four family-style restaurants (from the same national chain) of similar clientele and identical menu selections for a study designed to measure the impact of menu labeling on sales of targeted items. Menus were reviewed by a registered dietitian, and those entrees that contained less than 15 grams of fat and 125 milligrams of cholesterol were labeled with a red heart. In addition to these menu labels, an explanatory sign was strategically located near the menu-board to explain the presence of the heart labels. The authors utilized a pre/post-time series design to measure sales of targeted items during a four week period prior to and after implementation of the labeling program. Sales data were analyzed via time series models. Results of the analysis indicated that two of the four restaurants experienced significantly increased sales of targeted menu items. In addition to sales data collection, a customer survey was conducted to examine demographic characteristics and reasons behind entrée selection. Survey data were obtained from 526 respondents (estimated 75%-90% response rate) with approximately equal percentages of males and females. Significant differences in reasons for selecting a low-fat entrée were reported for customers who chose such an entrée and those that did not. Taste and desiring a healthy entrée were the most frequently cited reasons among customers who chose a labeled entrée. Taste and wanting to try something different were the most frequently cited reasons among customers who did not select a labeled entrée. The authors concluded that the sales data provided moderate support for the hypothesis that a nutrition labeling

program can influence customer selections of low-fat, low-cholesterol menu items (Albright, Flora, and Fortmann, 1990).

Almanza, Mason, Widdows, and Girard (1993) used three labeling formats: colored dots, apples, and a nutrition pamphlet to observe effects on selections of labeled entrée items in a university restaurant. Customers were surveyed non-randomly for a one week period prior to implementation of the labeling formats to collect data on entrée selections and factors influencing these selections. Customers were asked to only fill out the questionnaire one time. Following the control period, each labeling format was implemented for a one week period starting with the format which provided the least information. A 24 percent increase in targeted entrée selections occurred with the apple format and a 33.8 percent increase with the colored dot format. However, these were not statistically different. Targeted entrée selections doubled following implementation of the pamphlet format, and was deemed to be very significant. The authors acknowledged the presence of a possible learning effect during the study, but concluded that the pamphlet format was able to produce the greatest increase in targeted entrée selections (Almanza, et al. 1993).

Green, Steer, Maluk, Mahaffey, and Muhajarine (1993) evaluated the Heart Smart Restaurant Program (HSRP) which served as a Canadian national public education program. One component of this program involved promotion of healthy food items within participating restaurants. The primary goal of the program was to make healthful food choices more readily available in table-service type restaurants and to encourage customers to select the healthy choices. Restaurants willing to participate in the national program allowed recipes to be analyzed by the Heart and Stroke Foundation. Qualifying

items could be labeled on menus with a heart symbol. Telephone surveys were conducted with a random sample of 999 individuals throughout the cities of Saskatoon and Regina, Saskatchewan, to evaluate customer response to the program. Public awareness of the program was satisfactory. However, over half of those who knew of the program did not completely understand its function. Interviewees responded that they were not greatly influenced by the HSRP program when considering which restaurant to visit. Consumers indicated that they were more likely to choose a healthy alternative in a Heart Smart restaurant versus another. The authors concluded that increased promotional efforts would be required to properly educate the public on the purpose and benefits of the Heart Smart Restaurant Program. The authors were unable to conclude that the program had resulted in increased selections of healthful foods (Green, et al. 1993).

Casarez, Lee, Jacob, Lee, and Medora (1994) reported results of their study conducted in a university cafeteria which was designed to measure the effects of providing point-of-purchase nutrition information on sales of targeted items. The participants ranged in age from 21-25 and included 664 females and 542 males. The study consisted of three phases: a three-week baseline period, four-week intervention period, and another three-week baseline period following removal of the nutrition information material. Posters, menu marquees, and nutrition flyers were designed to promote food items from the Asian and Mexican stands which met the nutritional requirements. Customers were surveyed to determine factors which influenced purchase decisions. Analysis of variance revealed no significant differences in total sales within either of the three phases. However, significant differences were noted between periods in relation to the proportion of high-fat and low-fat items sold. Survey results indicated

taste, price for value, and appearance were important factors for selection decisions. Price for value significantly influenced selections of both Asian and Mexican food items. The authors concluded that provision of point-of-purchase nutrition information can be an effective means for promoting healthy food items and for providing educational information (Caserez, et al. 1994).

Levin (1996) utilized heart symbols to promote entrees which met nutritional requirements in a cafeteria setting. A repeated measures, comparison group, quasi-experimental design was used in the study. The two cafeterias were matched demographically and had similar menus and pricing. Computerized cash register receipts were used to record sales of targeted and non-targeted items at the experimental and control cafeterias. A two week baseline period was followed by a total of four weeks of intervention. Seven months later a follow-up period of two weeks duration was measured at the experimental site. The heart decals remained in place over the seven month period. Results indicated that sales of targeted items at the experimental facility increased significantly above baseline and control levels following implementation of the labeling protocol. Sales were found to be significantly elevated at the seven month follow-up point. The authors concluded that the use of simple heart symbols was effective in influencing customer entrée selections (Levin, 1996).

Holdsworth, Haslam, Raymond, and Leibovici (1997) evaluated customer perceptions of the Heartbeat Award Scheme (HBA) launched in 1990 throughout many English restaurants. Establishments received the HBA if they provided healthful menu choices, a non-smoking area, and appropriate standards of hygiene. A total of 271 questionnaires were completed by customers from 11 different establishments that had

held the HBA designation for greater than one year. Over half of the respondents (53 percent) were unaware that the establishment possessed an HBA, 67.5 percent were unable to state the criteria of the program, and 82.7 percent of the respondents did not know that menus had been analyzed by a dietitian. Those respondents who were aware of the program reported that it was of little concern when deciding upon which establishment to visit. These findings mirrored those from the study of Green et al. (1993). Holdsworth, et al. (1997) concluded that customers appear to want healthy offerings available, however, the presence of the program does not influence their decision of which establishment to visit. Consistent with recommendations from Green et al. (1993), Holdswort et al. (1997) also stressed the importance of additional promotion to increase customer awareness of the program.

Perlmutter, Canter, and Gregoire (1997) collected sales and acceptability data before, during, and after implementation of a nutrition labeling protocol. The study was conducted in a worksite cafeteria setting which served approximately 200 people per day. Seven entrees were chosen for modification to meet specific nutritional requirements. Sales data were gathered during a baseline period, following modification of the entrees, and following implementation of the labeling protocol. Acceptability data were collected on targeted entrees prior to modification, after modification, and following implementation of the labeling protocol. The intervention materials consisted of a large sign which indicated calorie, fat, cholesterol, and sodium content of the entrees. Additional 3X5 inch laminated logos ("Reach for the FB Stars") were placed on the serving line above the corresponding entrees. Logos were fixed to the menu price board beside the entrée's name. No significant differences in sales of entrees during any phase

of the study were found. Acceptability data also showed no significant differences across study phases. Acceptability scores of the modified entrees tended to increase once the customers knew that they had been modified and marketed as a healthful choice. The authors concluded that customers may be more willing to accept changes in flavor characteristics if the modified entrees are promoted as healthy and nutrition information accompanies the selections (Perlmutter, et al. 1997).

Consensus

The ability of point-of -purchase nutrition labeling to exhibit influence on customer selections of targeted food items has not been conclusively shown. The studies of Zifferblatt et al. (1980), Cincirpini (1984), and Mayer, et al. (1987) which utilized incentive based systems within their promotional protocol did produce significant changes in customer meal selections. Non-incentive based systems did not appear to be as consistently influential. Dubbert et al. (1984) observed increased sales of targeted vegetables and salads, however, entrée selections remained unchanged. Albright et al. (1990) failed to observe any significant increases in entrée sales following a labeling protocol in two of the four restaurants studied. Perlmutter et al. (1997) also observed no significant increases in any targeted entrée items after a labeling protocol was implemented in a worksite cafeteria. Others, such as Wagner and Winett (1988) and Anderson and Haas (1990) did report increased sales of targeted items, however, did not report any statistical significance of these findings.

Point of Choice Labeling in Supermarkets

Lack of influence of a nutrition labeling campaign has been reported in the supermarket setting as well. Ernst, Wu, Frommer, Katz, Matthews, Moskowitz, Pinsky, Pohl, Schreiber, Sondik, Tenney, Wilbur, & Zifferblatt (1986) evaluated the effectiveness of the *Foods for Health* nutrition education campaign. The protocol was implemented in 90 Giant Food Stores in the Washington D.C. area for a one year period. Giant Food Store shoppers from the Baltimore area served as the control. The intervention materials consisted of *Eater's* Almanacs available within the stores, shelf signs placed next to targeted food items, and media cues placed on radio and within various news publications. In-store promotional posters, banners, and signs were used to provide additional exposure. A random procedure was used to select 2,399 shoppers for a telephone survey. Intent of the survey was to gain insight into changes in knowledge and behavior among shoppers. Computerized sales data was used to monitor changes in buying habits. Both the survey and the sales data tracking were conducted before, during, and after the campaign was implemented. Results indicated a significant increase in knowledge scores for the Washington shoppers. Based on sales data, no significant changes in purchasing habits were observed. The authors concluded that other factors, such as price or cultural preferences, most likely exhibit strong influence on shoppers' purchasing behavior (Ernst, et al. 1986).

Muller (1984) had previously conducted a study in the supermarket setting using suspended signs to compare the nutritional composition of five different food types across several brands. Two supermarket sites were chosen within a large Canadian city. Each food item was given exposure with the nutrient signs for two consecutive weeks.

Sales data were collected during each week the signs were in place. Nutrients chosen for labeling were determined from customer surveys conducted prior to the study period. Those nutrients deemed most important by consumers were included on the signs. Each brand was rank ordered according to its nutrition value. This brand rank was easily observed by all shoppers. The authors hypothesized that if shoppers were using the nutrition information there should be a shift in purchases to those brands with the higher nutrition ranks. Sales data revealed that for three of the five products there was a shift toward the higher ranked products during the first week and this shift continued into the second week for two of the products. The author was unable to explain why consumers shifted toward certain higher nutritionally ranked products, but not others (Muller, 1984).

Labeling Formats

Work has expanded to include other possible factors which may serve to influence customers' selection of healthy items. Specific attention has been devoted to determining which label formats are most optimal. Geiger, Wyse, Parent, and Hansen (1991) used adaptive conjoint analysis (ACA) on data gathered from a shopping mall intercept survey to measure consumers' perceptions of label usefulness among several label combinations. Factors which were varied included information format (traditional, bar graph, and bar graph nutrient density), load (some, more, and most), expression (traditional, absolute numbers, percentages, both absolute numbers and percentages), and order of the information. Computer interactive interviews were completed by 252 consumers. The majority were aged between 25 and 34 and were married. A significant preference for the bar graph format over the traditional and bar graph nutrient density formats was

found. Consumers preferred data to be presented in absolute numbers and percentages and wanted the most information load (Geiger, et al.1991).

Levy, Fein, and Schucker (1992) illustrated the importance of performance and preference when evaluating label formats. The authors chose five formats to test for performance and preference attributes. A shopping mall intercept method was used to obtain a quota-controlled sample of 1,460 food shoppers greater than 18 years of age. Consumers scored the worst in accuracy with the bar graph format. This contradicts the evidence provided by Geiger et al. (1991) which determined that consumers most preferred the bar graph format. The authors concluded that preference and performance do not necessarily agree. Formats that were deemed easy to use by certain customers were criticized due to lack of adequate information by others. The reverse was also true. Formats that some customers liked for displaying adequate information, others disliked for being difficult to use (Levy, et al 1992).

Almanza and Hsieh (1995) compared consumer preference for three different label formats in a university cafeteria. Customers were primarily staff, faculty, and students. All customers were asked to complete a survey regarding preferences for the three label formats: apple, colored dots, and pamphlet. Meal coupons were offered as an incentive to complete the questionnaire. Regression analysis performed on the data indicated that attractiveness was the most important attribute considered in determining preference. The colored dot format was least preferred. The apple and pamphlet formats were rated most attractive and easiest to use. The authors concluded that in addition to attractiveness, the ease of use and clarity of presentation were of importance when considering the optimal labeling format (Almanza and Hsieh, 1995).

The critical relationship between the consumer and consumer information was further emphasized by Schmidt and Spreng (1996). These researchers proposed a model that organizes the determinants of the consumer information search process into four distinct categories: ability to search, motivation to search, costs to search, and benefits of search. A nutrition label in the context of this model would be designed in a fashion that: (1) does not exceed the consumer's ability to utilize or understand the information provided; (2) motivates the consumer to process the information; (3) does not require an excessive amount of effort to process, and (4) provides the consumer with some element of benefit.

The Geiger et al. (1991), Levy et al. (1992), Almanza and Hsieh (1995) studies and the research of Schmidt and Spreng (1996) are in complete agreement that the format utilized to provide specific information to the consumer should be designed in a clear and attractive manner, be easy to use, and provide adequate information with which to base decisions. Additional research is needed to identify a labeling format which will be able to consistently satisfy these criterion.

Other Influential factors

Additional research has been directed at identifying specific factors that may influence customer food selections. Dalton, Linke, and Simko (1986) utilized a two-part survey to compare "intended" and "actual" food choices of 202 respondents in the worksite setting. Reasons for food choice, attitudes toward food choice, and differences between intended and actual selections were compared. Approximately 64% of the respondents made consistent food choices (intended versus actual were the same), while

36% made inconsistent choices (intended versus actual were different). Factor analysis revealed three primary reasons for food selection: "sensory appeal', "health value", and "expediency". Repeated measures analysis of variance determined that sensory appeal was the major determinant of food selections for both groups of respondents. The authors concluded that a successful program geared at modifying customer food selections must accommodate taste as an influential factor (Dalton, et al. 1986).

Granzin and Bahn (1988) obtained a random sample of adults from a small eastern city to gain insight into their nutrition attitudes in relation to restaurants. The mean age of the 747 participants was 32.9 years; 41% and 59% were male and female, respectively. Participants were asked to complete a questionnaire which measured attitudes toward nutrition (ten items) and the benefits that were required when choosing a restaurant (25 items). Canonical correlation was used to produce four significant roots which served to describe joint characteristics of separate market segments. Segment A reported attitudes indicating that nutrition was important and that restaurants should emphasize nutrition while providing a high quality dining experience. Segment B maintained that it is difficult to find nutritious as well as "good tasting" food and felt that to attain a well-balanced meal, one must prepare the food themselves . This segment also was willing to forego taste for a high value nourishing meal. Segment C indicated a strong desire for nutrition information and felt that fast food restaurants had improved nutritional offerings. The segment also emphasized the importance of price and value within restaurants. Segment D did not care to have nutrition information available and did not think that restaurants offered more nutritional choices. This segment desired those attributes most associated with a fine-dining establishment. The authors concluded

that in order to provide effective educational programs, developers must consider the varying attitudes of the dining public. Overall, results indicated a receptivity among respondents toward the opportunity for obtaining good nutrition while eating meals away from home (Granzin, and Bahn, 1988).

Perlmutter and Gregoire (1997) surveyed employees at a large insurance company to determine factors that influence selection of entrees. The survey required respondents to rate 13 factors on the basis of importance and their degree of perceived influence on purchasing decisions. The same questionnaire was distributed again to the employees following implementation of a marketing program for healthy entrees. Analysis of variance revealed that perceived food quality and price were the most important factors influencing entrée selections. Price appeared to influence purchase decisions more than health attributes. The study outlined the importance of other factors besides health, which may drive consumer purchase decisions. The authors identified food quality and price as the factors perceived to be most influential by respondents (Perlmutter and Gregoire, 1997).

The work of Dalton et al. (1986), Granzin and Bahn (1988), Colby et al. (1987), and Perlmutter and Gregoire (1997) supported the findings of Albright et al. (1990) who reported that taste was a significant factor in customer decisions to purchase healthy entrees. Casarez et al. (1994) also reported that taste, price for value, and appearance were significant factors motivating customer purchase decisions.

A study conducted by Fitzpatrick, Chapman, and Barr (1997) also addressed the importance of taste in evaluating customer satisfaction with low-fat entrees. A random sample of 686 restaurant customers was selected from eight restaurants that participated

in the study. Customers were then selected from this sample and asked to complete a questionnaire which served to identify factors influencing satisfaction. Of the eight satisfaction indicators studied, presentation, taste, and price/value were frequently cited as important by the participating customers. Customers were quite satisfied with the low fat entrees provided by the restaurants and demonstrated willingness to support restaurants providing healthy choices (Fitzpatrick et al, 1997).

Recently Glanz, Basil, Maibach, Goldberg, & Snyder (1998) analyzed responses from two self-administered surveys distributed to a national sample of 2,967 adults. The surveys, distributed by Market Facts, Inc., were designed to measure the perceived importance of taste, nutrition, cost, convenience, and weight control in relation to dietary choices. The authors reported that taste, followed by cost were the most important considerations. Multivariate analyses revealed significant differences across the demographic variables age, gender, income and ethnicity. Specifically, older persons rated nutrition and weight control as highly important, while younger persons rated cost and convenience as highly important. Women rated nutrition, taste, cost, and weight control of higher importance than men. Those who reported lower incomes rated the importance of cost and convenience highly. Finally, non-whites rated the importance of taste, nutrition, cost, convenience, and weight control higher than whites.

Role of Chefs

In order for restaurants to meet customer demands for low-fat selections which provide adequate flavor and appeal, it will be necessary to properly educate chefs about

healthy dietary guidelines. Palmer and Leontos (1995) reported their experiences using the Project LEAN (Low-fat Eating for Americans Now) social marketing initiative in a Las Vegas community. Emphasis was placed on motivating and empowering chefs to create low-fat yet "good-tasting" cuisine. Chefs who agreed to participate in the program attended a series of nutrition education classes designed to provide information regarding the health risks associated with dietary fat, customer interest in lower fat meals, and recipe modification. In all, 92 chefs completed the training. The authors reported that in general, chefs were receptive to the training and were able to produce low-fat cuisine that was satisfying to customers (Palmer and Leontos, 1995).

Reichler and Dalton (1998) examined chef's attitudes in comparison to the Dietary Guideline for Americans. An analytical survey was distributed to 512 chefs, student chefs, and chef educators; 447 surveys were returned for an 86% response rate. Survey data included measurements of food science knowledge, likelihood of using cooking practices which would satisfy the 1990 Dietary Guidelines for Americans, and indications of the importance of healthful food preparation. The authors found that all chef groups were confused about fat and cholesterol metabolism in the body. No chef group was likely to utilize healthful preparation techniques more than two-thirds of the time. However, both chef groups expressed attitudes indicating the importance of healthful cooking techniques. The majority of practicing chefs felt that consumers cared little about the U.S. Dietary Guidelines. Student chefs held opposing beliefs. Chefs and student chefs agreed that it was they who were responsible for the nutritional composition of foods being prepared. The authors indicated that both chefs and student chefs were

willing to receive education designed to assist and guide them in preparing healthful menus (Reichler and Dalton, 1998).

Given that customer interest in nutrition and health continues to increase as does the reliance on meals served away from home, it is evident that additional research needs to be conducted to determine the most effective means for providing nutrition information to the consumer. Government regulations may very well pose additional challenges to restaurateurs to provide such information. Undoubtedly, attention will continue to focus on factors other than health which may influence customer purchase decisions. As a result, chefs must be empowered and motivated to produce healthful, tasteful, and appealing cuisine.

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Chapter 3

Methodology

Research Site

The Fort Riley, Kansas, Main Post Dining Facility was the research site chosen for this study. The facility serves breakfast, lunch, and dinner seven days a week. A midnight breakfast meal is served from 2330 to 0030. Rotating shifts allow staffing on site 24 hours per day. Breakfast is served from 0600 to 0830, followed by a continental breakfast from 0830 to 1000. The lunch meal is served from 1130 to 1300, and the dinner meal from 1630 to 1800. There are approximately 300 meals served during lunch with a range between 200 and 400. Participation at the midnight meal is variable, ranging from one to thirty meals. Breakfast and dinner counts average 175 and 225, respectively.

The dining facility utilizes an a la carte-system and has three service areas: a hot food line, salad bar, and a short-order line. The hot food line offers two to three entrees (three if leftovers are being served), two starches, and two vegetables. The self-serve salad bar allows customers to prepare a small, medium, or large-sized salad. The short order line provides grill items such as hamburgers, hotdogs, french fries, made-to-order sandwiches, both cold (deli style) and grilled. Soups, beverages, desserts, fresh fruits, and condiments are provided in convenient locations within the serving area. An extension from the salad bar provides a self serve taco bar on Tuesdays and Thursdays, and a self-serve potato bar on Monday, Wednesday, and Friday.

All active duty military personnel assigned to Fort Riley Army Base are eligible to dine at this facility. Active duty members comprise, by far, the largest percentage of the customers. Facility employees, authorized visitors, and transient military employees and their dependents also may utilize the facility. Menu prices range from $.55 to $4.00 for entrees and $.15 to $.45 for vegetables and starches. Fruits average $.35 to market price, while desserts range from $.25 to $.55. All menu prices are derived based on raw ingredient costs plus any additional contractual costs.

Research Design

To measure the influence of a nutrition labeling protocol on sales of targeted entrees, computerized cash register sales data were utilized. Wagner and Winett (1988), Anderson and Haas (1990), Albright, Flora, and Fortmann (1990), Levin (1996), and Perlmutter, Canter, and Gregoire (1997) successfully utilized cash register sales data in their research.

A quasi-experimental design consisting of a 12 month baseline measurement period followed by two 30 day post-intervention measurement periods was followed. The total numbers of healthy entrees (defined under entrée analysis section) and non-healthy entrées sold (on a daily basis) were recorded during the baseline period from retrospective data kept on site. The intervention materials (discussed under labeling protocol) remained in place for the duration of the study period, once installed. One week after introduction of the labeling protocol, sales data for all recipes included in the study were collected for 30 days (Sep 7, 1998 to Oct 6, 1998). An additional 30 day sales data collection period was conducted one month later (Nov 7, 1998 to Dec 6, 1998) to see if

any changes in sales noted from the first period were sustained. The proportion of "Check it Out" entrée to total entrée sales was compared to observe any differences in "Check it Out" entrée selections among the baseline and measurement periods. Levin (1996) also measured the proportion of targeted entree to total entrée sales to determine any differences in sales of the targeted items among baseline and experimental periods.

Attitude questionnaire

Following completion of the first experimental period (Oct 6, 1998), facility employees distributed a short (one-sided, one page), questionnaire (Appendix A) among the dining customers as they ate. Informed consent statements (Appendix B) were obtained before customers completed the survey. Upon completion, the questionnaires and signed informed consent statements were then handed back to the facility personnel. The purpose of the attitude questionnaire was to collect demographic data about the customers and to obtain insight into factors influencing their meal selection decisions.

Demographic data included: age, sex, rank, length of time the respondent had utilized the facility for the lunch meal, and whether or not the respondent was presently on the weight management program. Other information collected included: whether or not the "Check it Out" materials were visible, whether or not the materials influenced entrée selections, whether or not the materials caused a change in attitude about nutrition, and the influence of certain factors such as appearance, taste, price, caloric and fat content, and quality on meal selection decisions. These latter five attributes have been previously identified as significantly influential factors from the studies of Dalton et al. (1986), Albright et al. (1990), Casarez et al. (1994), Perlmutter and Gregoire (1997), and

Glanz et al. (1998). A seven point (1-7) Semantic scale was used to measure the degree of influence each factor had on a respondent's selection decisions.

The questionnaire was pilot tested with a convenience sample of 20 customers. No modifications to the survey were necessary. Data gathered from the pilot were not included in the final results of the study. The final questionnaire was made available for distribution over four consecutive lunch periods (Oct 7 through Oct 10, 1998, inclusive). Distribution was halted once facility employees were unable to locate any additional customers who had not previously filled out a survey. Although unable to guarantee that customers only filled out one survey, the staff encouraged use of the honor system and used verbal reminders to help avoid this possibility. A facility supervisor had previously reported that typically, nearly 90% to 95% of the customers at this facility agree to fill out surveys when asked. J. Warden (personal communication, April 17, 1998). Therefore, no incentives were used to encourage participation.

Entrée Analysis

A total of 54 entrée recipes were analyzed using Nutritionist IV (version 3.5) diet analysis module (N-Squared Computing, First Data Bank Division) and from nutrient data provided by the manufacturer's packaging label. Large salads were considered an entrée for purposes of this study. Those entrees with less than 15 grams of fat and 100 milligrams of cholesterol per serving were designated as a "Check it Out" entrée (elsewhere in this thesis, also referred to as a "healthy" entrée). There were 18 entrees that met the "Check it Out" criteria. Four entrees were deleted from the study due to insufficient sales of the item. Seven entrees with nutritionally similar content were

combined (i.e., sales of baked fish and baked fish portions were recorded under the single recipe title of baked fish). Sales data for a final total of 43 entrees were recorded and analyzed for this study. The nutritional analysis of all entrees was conducted by the researcher, who is a registered dietitian. For this study no recipes were modified from baseline formulations.

Labeling Protocol

The nutrition labeling and promotional materials utilized for this study were identical to the "Check it Out" materials utilized by Air Force dining facilities. All qualifying entrees were labeled at their respective location on the serving line with a 3 X 5 inch laminated card which displayed the "Check it Out" logo (Appendix C). Calorie, fat, and cholesterol information was provided on this 3 X 5 card in black ink. Large colored posters displaying the slogan "It's A Sure Sign You're Eating Better" with the "Check it Out" lightning bolt logo were hung on walls within the serving mall and at the entrance to the serving area (Appendix D).

One week prior to implementing the labeling information (Aug 26, 1998) an explanatory poster was placed at the entrance to the dining facility to provide advance notice of the up-coming program. A stack of one-page flyers (Appendix E) containing the exact content of the explanatory poster were available on a table for customers to read about the "Check it Out" program at a later time if desired. Refrigerator magnets bearing the "Check it Out" logo were also available for customers to take (Appendix F).

Dependent Variable

For this study, the dependent variable was defined as customer entrée selections as evidenced by cash register sales receipts. Specifically, the proportion of "Check it Out" entrees to total entrees purchased.

Independent Variables

For this study, the independent variables were the nutrition labeling information and promotional materials of the "Check it Out" protocol, taste, appearance, price, and perceived quality as well as the demographic variables of age, rank, placement on the weight management program, and payment method.

Data Collection

Data collection was performed from end-of-meal cash register records. The total number of each entrée purchased was recorded by the cash register during each meal. Daily retrospective data was obtained for the most recent 12 month period (Sep 1, 1997 to Aug 31, 1998) prior to implementation of the labeling protocol (Sep 1, 1998). The proportion of qualifying "Check it Out" entrees to total entrée sales was calculated for each day of the historical 12 month period. During the two 30 day experimental measurement periods (Sep 7. 1998 to Oct 6, 1998, and Nov 7, 1998 to Dec 6, 1998) the proportion of "Check it Out" entree to total entrée sales were figured in the identical manner.

Data Analysis

All data was analyzed using SPSS for Windows statistical software, version 8.0. Frequency distributions were computed for all variables. Means were computed for all

continuous variables. Analysis of variance (ANOVA) was utilized to compare the means of "Check it Out" entrée sales (as a combined category) between the historical and the two post intervention periods. Differences in the mean proportions of "Check it Out" entrée to total entrée sales between the historical and post intervention periods were also analyzed using ANOVA. In case the distribution of this proportion data was not normal, an additional ANOVA was conducted on the natural log of the proportions.

Chi-square analysis was used to detect differences (based on age, rank, sex, and payment method) among respondents' answers to the following questions: "Did you notice the check it out displays?", "Did the check it out materials influence your meal selections?", and "Have the check it out materials influenced your attitude about nutrition for the better?".

ANOVA was used to compare the mean rating scores (based on age, rank, sex, and payment method) given to the following variables: importance of the provision of nutrient information, taste, appearance, calorie content, fat content, price, and quality. Paired-sample T-tests were conducted to compare the mean rating scores within a single demographic category. To control experiment-wide error during the paired-sample comparisons, the Bonferroni procedure was applied.

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Chapter 4

Article one

The Influence of a Point of Purchase Nutrition Labeling Program on Sales of Targeted Entrees in a Military Dining Facility

ABSTRACT

Objective This study assessed the effectiveness of an Air Force point of purchase nutrition labeling program (The "Check it Out" program) in influencing sales of targeted entrees.

Design A Quasi-experimental design was utilized to compare sales of targeted entrée items between a one year baseline period and two 30 day post-intervention periods. The intervention materials and displays were in place for one week prior to recording post-intervention sales data. A period of 30 days separated the first intervention period from the second.

Subjects/setting The Fort Riley Main Post Dining Facility served as the site of the study. One hundred, forty nine customers completed a brief questionnaire which recorded demographic information and reaction to the promotional materials of the "Check it Out" program.

Intervention The promotional materials and displays associated with the "Check it Out" (CIO) program included large posters, bearing the CIO label, (strategically placed within the serving areas), and nutrient display cards (placed in front of the corresponding entrée) which included the fat, calorie, and cholesterol content of the entree. Once implemented, these materials were left in place for the duration of the study period.

Outcome measures The mean sales of targeted entrees as well as the proportion of targeted entrée to total entrée sales were used to compare pre- and post-intervention sales periods.

Statistical analysis One-way analysis of variance (ANOVA) was used to detect significant differences between the baseline and post-intervention sales data. Chi-square analysis was used to determine differences in reactions to the program based on age, rank, sex, and payment method.

Results No significant differences in sales of targeted entrée items were detected between the baseline and two intervention periods. Only one fifth of the responding customers reported that the labeling materials had any impact on their meal selection decision.

Applications/conclusions The results of this study suggest that a marketing campaign focusing on the health attributes of targeted entrée items was not successful in boosting sales of these items among the population studied. The findings of this study may be of particular interest to organizations or clinicians who desire to influence the meal habits of certain populations or individuals.

Introduction

Much effort has been directed and continues to be directed at the problem of finding the most effective method for providing accurate and reliable nutrition information at the point-of-purchase to dining customers. The goal of any nutrition labeling program should be to provide adequate information so that customers may choose food items which provide optimum health benefit. Ideally, the labeling program will exert influence on the customer to make the healthier selections. Many researchers have reported that despite offering healthful food items and providing influential nutrition information, not all customers opt to select the healthy food (1-3). It has been reported that education, age, and gender are most closely associated with food choice behaviors

that reflect recommendations to reduce dietary fat and increase fruit and vegetable consumption (4-5).

An abundance of research has been conducted which examined the overall effectiveness of point of purchase nutrition labeling protocols in various settings. The findings were mixed. Several authors reported positive changes in targeted entrée selections following implementation of incentive based nutrition labeling programs (6-8). The incentives included items such as cash rebates, games, and raffles. Other authors produced significant changes in targeted food selections without the additional use of incentives (9-14). These programs simply emphasized the health attributes of the targeted foods. However, other researchers, using similar non-incentive based labeling protocols, produced only limited changes in targeted food selections or none at all (15-20).

The U.S. Air Force launched a nutrition labeling campaign of its own in November of 1992. Termed the "Check it Out" program, this nutrition marketing campaign was developed by the Air Force Nutrition Committee in conjunction with commercial marketing contractors and was implemented in more than 1000 dining facilities across 105 Air Force bases. The "Check it Out" program emphasizes low-fat, nutritious foods, and brings attention to the importance of exercise. The program utilizes eye-catching red lightning bolts, table tents, menu boards, stationary, and steamtable nutrition labels to convey healthy messages to dining customers. Although substantial research regarding the effects of nutrition labeling protocols has been conducted in the civilian setting, no objective data exist pertaining to the effectiveness of nutrition labeling efforts in influencing behavior change among active duty military members frequenting

base dining facilities. Specifically, no objective data exist regarding the effectiveness of the materials and displays of the "Check it Out" program in influencing meal selections among its target consumer. This study directly assessed the effectiveness of the materials associated with the "Check it Out" program in influencing sales of targeted entrée items among active duty members of an Army base dining facility.

Methods

Data Collection

To measure the influence of the "Check it Out" labeling protocol on sales of targeted entrees (discussed under entrée analysis), computerized cash register sales data was utilized. A quasi-experimental design consisting of a 12 month baseline measurement period followed by two 30 day post-intervention measurement periods was followed. The total number of targeted entrees and non-targeted entrées sold (on a daily basis) was recorded during the baseline period from retrospective data kept on site. The intervention materials (discussed under labeling protocol) remained in place for the duration of the study period, once installed. One week after introduction of the labeling protocol, sales data for all entrees included in the study were collected for 30 days. An additional 30 day sales data collection period was conducted one month later. The mean sales of targeted entrees as well as the proportion of targeted entrée to total entrée sales were compared across the baseline and post intervention periods to observe any differences.

Questionnaire

A convenience sample of 149 customers was obtained by facility staff over a four day period to fill out a brief questionnaire which was designed to collect demographic information and reaction to the promotional program. Information sought included: age, rank, sex, length of time utilizing the facility, whether or not the promotional materials were noticed, whether or not the materials had influenced meal selection, and whether or not the materials had resulted in a changed attitude about nutrition. The questionnaire was pilot tested on a convenience sample of 20 customers prior to distribution. Data from the pilot test were not included in the study. Although unable to guarantee that customers only filled out one survey, the staff encouraged use of the honor system and used verbal reminders to help avoid this possibility.

Labeling protocol

The nutrition labeling and promotional materials utilized for this study were identical to the "Check it Out" materials utilized by Air Force dining facilities. All qualifying entrees were labeled at their respective location on the serving line with a 3 X 5 inch laminated card which displayed the "Check it Out" logo. Calorie, fat, and cholesterol information was provided on this 3 X 5 card in black ink. Large colored posters displaying the slogan "It's A Sure Sign You're Eating Better" with the "Check it Out" lightning bolt logo were hung on walls within the serving mall and at the entrance to the serving area.

One week prior to implementing the labeling information an explanatory poster was placed at the entrance to the dining facility to provide advance notice of the up-

coming program. A stack of one-page flyers containing the exact content of the explanatory poster were available on a table for customers to read about the "Check it Out" program at a later time if desired. Refrigerator magnets bearing the "Check it Out" logo were also available for customers to take.

Entrée Analysis

A total of 54 entrée recipes were analyzed using Nutritionist IV (version 3.5) diet analysis module (N-Squared Computing, First Data Bank Division) and from nutrient data provided by the manufacturer's packaging label. Large salads were considered an entrée for purposes of this study. Those entrees with less than 15 grams of fat and 100 milligrams of cholesterol per serving were designated as a "Check it Out" entrée (elsewhere in this study, also referred to as a "healthy" entrée or a "target" entree). There were 18 entrees that met the "Check it Out" criteria. Four entrees were deleted from the study due to insufficient sales of the item. Seven entrees with nutritionally similar content were combined (i.e., sales of baked fish and baked fish portions were recorded under the single recipe title of baked fish). Sales data for a final total of 43 entrees were recorded and analyzed for this study. The nutritional analysis of all entrees was performed by the researcher, a registered dietitian. For this study no recipes were modified from baseline formulations.

Statistics

All data was analyzed using SPSS for Windows statistical software, version 8.0. Analysis of variance (ANOVA) was utilized to compare the means of "Check it Out"

entrée sales (as a combined category) between the historical and the two post-intervention periods. Differences in the mean proportions of "Check it Out" entrée to total entrée sales between the historical and post-intervention periods were also analyzed using ANOVA. In case the distribution of this proportion data was not normal, an additional ANOVA was conducted on the natural log of the proportions.

Results

Table 1 depicts the results of ANOVA performed on the entrée sales data. Three tests were performed. The first examined mean sales of qualifying "Check it Out" entrees between the baseline and experimental periods. The procedure determined that there were no significant differences between any of the periods. The second ANOVA examined the proportions of "Check it Out" entrée to total entrée sales between the baseline and experimental periods. Again, the procedure determined that no significant differences existed. The final procedure examined differences between the natural logs of the ratios. This was performed in the event the ratio data was not distributed normally. This ANOVA procedure indicated that there were no significant differences between the historical and post-intervention periods.

Table 1

Comparison of Mean Daily Sales Data for Historical and Post-intervention Periods

	Historical baseline[a]			Post-intervention 1[b]			Post-intervention 2[c]			
Sales category	N	Mean	SD	N	Mean	SD	N	Mean	SD	LOS[e]
All "Check it Out" (CIO) entrees	363	170.29	69.91	30	174.57	67.92	30	181.83	87.64	0.673
CIO entrée/total entrée sales	363	.45	.14	30	.45	.10	30	.48	.14	0.488
LN CIO entrée/total entrée sales[d]	363	-.22	.66	30	-.21	.44	30	-.0094	.61	0.577

[a] Historical baseline: 12 month period of daily sales prior to implementing nutrient displays.

[b] Post-intervention 1: 30 day period of daily sales measured after nutrient displays had been in place for seven days.

[c] Post-intervention 2: 30 day period of daily sales measured after nutrient displays had been in place for 68 days.

[d] LN CIO entrée/total entrée sales: natural log of the ratio of CIO entrée to total entrée sales.

[e] LOS: (level of significance) analysis of variance revealed no significant differences in CIO entrée sales between the historical and post-intervention periods.

Table 2 shows the demographic characteristics of the responding customers. Males comprised nearly 90% of the sample. Close to half (42.3%) of the responding customers were age 24 years or less, one-fourth (25.5%) of the customers were between the ages of 25 and 31, while the remaining customers comprised the two categories of 32 to 38 (12.8%) and greater than 38 (8.1%).

Table 2

Demographic Characteristics of Fort Riley Lunch Time Customers

Characteristic	Frequencies N	Percent
Age		
< or = 24	63	42.3
25-31	38	25.5
32-38	19	12.8
> 38	12	8.1
Missing[a]	17	11.3
Rank		
E6 or below	100	67.1
E7-E9	17	11.4
O1-O3	12	8.1
O4 or above	2	1.3
Other	2	1.3
Missing[a]	16	10.8
Sex		
Male	132	88.6
Female	13	8.7
Missing[a]	4	2.7
Length of time utilizing facility		
< 3 months	48	32.2
4-6 months	23	15.4
7-9 months	15	10.1
10 months or more	59	39.6
Missing[a]	4	2.7

[a] Missing: data omitted by respondent or removed from data pool.

Over three-quarters (78.5%) of the customers were enlisted while only a small percentage (9.4%) were officers. The majority of the enlisted customers (85.5%) were of the rank E-6 or below. The majority of the officers (86%) were of rank O1 to O3. Nearly 40% of the respondents reported utilizing the facility at lunchtime for a period of ten months or more, while another one-third (32.2%) reported that they had been eating at the facility for 3 months or less.

Table 3 depicts customer reaction to the promotional displays used to convey the "Check it Out" campaign. Approximately 60% of the respondents reported (unaided recall) that they had noticed the CIO materials throughout the dining facility. The majority (79.2%) of the responding customers indicated that the presence of these materials did not influence

Table 3

Customer Reactions to the "Check it Out" (CIO) Promotional Materials and Displays

Reaction		Frequencies N	Percent
Did you notice the CIO materials?	yes	89	59.7
	no	56	37.6
	Missing[a]	4	2.7
Did the CIO materials influence meal selection?	yes	30	20.1
	no	118	79.2
	Missing[a]	1	0.7
Did CIO materials influence attitude about nutrition for the better?	yes	32	21.5
	no	112	75.2
	Missing[a]	5	3.3

[a] Missing: Data omitted by respondent or removed from data pool.

their meal selection decisions. The majority (75.2%) of the customers also reported that the materials did not influence their attitude about nutrition for the better.

Table 4 depicts customer reaction to the CIO materials and displays across the demographic segments of age, rank, and sex. Chi-square analysis of the frequencies revealed no significant differences in reactions based on age, rank, or sex.

Table 4

Differences in Reactions to the "Check it Out" (CIO) Displays Based on Age, Rank, and Sex.

Demographic Category	Reactions: Did you notice the CIO displays? Yes N	Yes %[c]	No N	No %[c]	LOS[a]	Did the CIO displays influence your meal selections? Yes N	Yes %[c]	No N	No %[c]	LOS[a]	Did the CIO displays change your attitude about nutrition? Yes N	Yes %[c]	No N	No %[c]	LOS[a]
Age															
24 years or less	36	57.1	25	39.7		13	20.6	50	79.4		13	20.6	47	74.6	
25 years or more	44	63.8	23	33.3	0.437	12	17.4	56	81.2	0.664	14	20.3	53	76.8	0.916
Rank															
Enlisted	70	59.8	43	36.8		24	20.5	92	78.6		25	21.4	87	74.4	
Officer	8	57.1	6	42.9	0.728	2	14.3	12	85.7	0.571	3	21.4	11	78.6	0.94
Sex															
Female	5	38.5	7	53.8		2	15.4	10	76.9		0	0.0	12	92.3	
Male	81	61.4	48	36.4	0.151	27	20.5	105	79.5	0.754	30	22.7	98	74.2	0.058

[a] LOS: level of significance determined by Chi square analysis

[b] %: Percentages may not add to 100 because of missing data or the data may have been removed from the data pool.

Discussion

The results of the Fort Riley Main Post Dining Facility sales data analysis suggest that the "Check it Out" promotional materials and displays had no subsequent impact on sales of targeted entrees. Survey data revealed that the majority of the customers had noticed the promotional displays; however, only one fifth of the sample reported that the materials had influenced their meal selections. Additionally, only about one fifth of the sample reported that the materials had changed their attitude about nutrition for the better.

As previously discussed, findings from Hunt (4) and a 1990 survey conducted by the National Restaurant Association (5) suggested that younger aged males would tend to care very little about nutrition related issues. Given that the sample from our study was predominantly male and aged 24 years or less, the results of our sales data analysis and the findings from our survey tend to reflect this demographic characteristic.

Applications/conclusions

The results of this study suggest that a marketing campaign focusing solely on the health attributes of targeted entrée items was not successful in boosting sales of these items among the population studied. Further, respondents overwhelmingly indicated that they had not been influenced to choose targeted food items upon seeing the promotional materials. Perhaps a more effective approach to influencing meal selections lies in a marketing campaign which emphasizes some other, non-health related, attributes of the targeted food items, or a combination of both. The findings of this study may be of

particular interest to organizations or clinicians who desire to influence the meal habits of certain populations or individuals.

Limitations must be considered when pondering conclusions drawn from this study. First, the study was conducted at only one military dining facility. Results could have differed if an alternative facility had been studied, or if several facilities had been studied.

Further, one may pose an argument that due to high personnel turnover on a military base, the one-year period of historical sales data may have originated from a different set of customers than those who were present at the time of the two post intervention periods. However, survey data revealed that only approximately 30% of the responding customers had been utilizing the facility for three months or less. Therefore, the selected sample of respondents does provide a reasonably accurate representation.

Findings from this study should only be generalized to other military populations, which would likely share similar demographic composition. Attempting to generalize to the more diverse civilian population would not be prudent.

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Chapter 5

Article two

Factors Which Influence the Meal Selections of Active Duty Military Personnel Frequenting a Base Dining Facility

ABSTRACT

Objective This study assessed the degree of perceived influence that certain factors such as taste, appearance, fat content, calorie content, price, and quality had on the meal selections of active duty military personnel. Additional factors reported by theses military personnel to influence meal selections were also examined.

Design A survey utilizing semantic scales (1= no influence to 7= extremely influential) was used to measure the perceived influence of the aforementioned factors on meal selections as well as to gather demographic data.

Subjects/setting The Fort Riley Main Post Dining Facility served as the site of the study. One hundred, forty nine active duty military personnel, chosen by convenience sampling completed the survey.

Statistical analysis ANOVA was used to detect differences in mean scores given to the influential factors based on age, rank, sex, and payment method. Paired-sample t-tests were used to compare mean scores given to the influential factors within a like demographic category. During the paired-sample tests, the Bonferroni procedure was used to calculate the required significance level, in order to reduce experiment-wide error.

Results Respondents rated the factors of taste, appearance, and quality significantly more influential to meal selection than calorie content, fat content, and price ($P<.000$).

Applications/conclusions The results of this study suggest that the non-health related attributes of foods (i.e. taste, appearance, and quality) are more influential to meal selections than health attributes. The findings of this study may be of particular interest to organizations or clinicians who desire to influence the meal habits of certain populations or individuals.

Introduction

According to the Department of Defense (DOD) Pharmacoeconomic Center (PEC) update there were 4,273 enlisted members separated from the military during the 1995 fiscal year because of obesity (1). The average cost to recruit, train, and replace these active duty members was estimated to be approximately $40,000 per member. The combined overall cost for replacement of those members discharged in 1995 was estimated to be approximately $169 million (1). Results from the 1995 DOD Survey of Health Related Behaviors (2) showed that 11.9 to 22.6 percent of active duty members (stratified for age group) were overweight or obese.

To assist active duty members with maintaining acceptable body composition, and ultimately to help reduce weight related discharges, efforts have been made to provide nutrition labeling at the point of purchase within base dining facilities. The intent is to influence members to choose those foods which provide the highest health value. Such food selections might then contribute to the optimum health and body composition of military troops. To date, the emphasis of the military nutrition intervention campaigns have centered around the health attributes of the targeted food items. However, it has been reported, that other factors, such as taste, appearance, value, and price may be more influential to meal selections than health attributes (3-11).

Additionally, it has been reported that education, age, and gender are most closely associated with food choice behaviors that reflect recommendations to reduce dietary fat and increase fruit and vegetable consumption (12-13). Specifically, these authors suggested that younger (~24 years) males would tend to be the least concerned about nutrition related issues. If a particular military population were concentrated with younger males, it would be reasonable to hypothesize that nutrition intervention messages aimed at influencing meal selections might not be particularly effective. Especially if the emphasis of the messages were health attribute related.

Our study directly assessed the degree of influence that the factors of taste, appearance, calorie content, fat content, price, and quality, had on the meal selections of active duty personnel in an Army base dining facility. We also determined other factors, specific to this population, which reportedly influenced meal decisions from time to time.

Hypotheses

Based on findings from studies such as Casarez et al (7) and Perlmutter et al (9) as well as from Hunt et al (12) it was expected that:

- Among those customers aged 24 years or less, calorie and fat content would be the least influential to meal selections.
- Among those customers who must pay cash for their meals, price would be the most influential to meal selections.

Methods

Facility employees distributed a short (one-sided, one page), questionnaire among the dining customers as they ate. Informed consent statements were obtained before customers completed the survey. Upon completion, the questionnaires and signed

informed consent statements were then handed back to the facility personnel. The purpose of the questionnaire was to collect demographic data about the customers and to obtain insight into factors influencing their meal selection decisions.

Demographic data included: age, sex, rank, whether or not the respondent was presently on the weight management program, and payment method. Other information collected included: the degree of influence that certain factors such as appearance, taste, price, calorie and fat content, and the perception of quality had on meal selection decisions. A seven-point (1= no influence to 7= extremely influential) Semantic scale was used to measure the degree of influence each factor had on a respondent's selection decisions. Additionally, customers were asked to rate the importance of being provided with nutrition information on a seven-point (1= not important to 7= extremely important) Semantic scale.

The questionnaire was pilot tested with a convenience sample of 20 customers. No modifications to the questionnaire were necessary. Data gathered from the pilot were not included in the final results of the study. The final questionnaire was made available for distribution over four consecutive lunch periods. Distribution was halted once facility employees were unable to locate any additional customers who had not previously filled out a survey. Although unable to guarantee that customers only filled out one survey, the staff encouraged use of the honor system and used verbal reminders to help avoid this possibility. A facility supervisor had previously reported that customer willingness to participate in surveys was high, therefore, no incentives were used to encourage participation.

Statistics

All data was analyzed using SPSS for Windows statistical software, version 8.0. Frequency distributions were computed for all variables. Means were computed for all continuous variables. ANOVA was used to compare the mean rating scores (based on age, rank, sex, and payment method) given to the following variables: importance of the provision of nutrient information, taste, appearance, calorie content, fat content, price, and quality. Paired-sample T-tests were conducted to compare the mean rating scores within a single demographic category. To control experiment-wide error during the paired-sample comparisons, the Bonferroni procedure was applied.

Results

Lunchtime Customer Demographics, Fort Riley Main Post Dining Facility

A total of 149 surveys were obtained during the lunchtime meal by convenience sampling. Table 1 shows the demographic characteristics of the responding customers. Males comprised nearly 90% of the sample. Close to half (42.3%) of the responding customers were age 24 years or less, one-fourth (25.5%) of the customers were between the ages of 25 and 31, while the remaining customers comprised the two categories of 32 to 38 (12.8%) and greater than 38 (8.1%).

Over three-quarters (78.5%) of the customers were enlisted while only a small percentage (9.4%) were officers. The majority of the enlisted customers (85.5%) were of the rank E-6 or below. The majority of the officers (86%) were of rank O1 to O3.

Approximately 60% of the customers paid for their meals with a government meal card, while the others reported paying cash. Only two customers reported that they were presently on the weight management program, therefore, no further analysis was performed based on this demographic characteristic.

Table 1

Demographic Characteristics of Fort Riley Lunch Time Customers

Characteristic	Frequencies N	Percent
Age		
< or = 24	63	42.3
25-31	38	25.5
32-38	19	12.8
> 38	12	8.1
Missing[a]	17	11.3
Rank		
E6 or below	100	67.1
E7-E9	17	11.4
O1-O3	12	8.1
O4 or above	2	1.3
Other	2	1.3
Missing[a]	16	10.8
Sex		
Male	132	88.6
Female	13	8.7
Missing[a]	4	2.7
On the weight management program?		
yes	2	1.3
no	144	96.6
Missing[a]	3	2.1
Payment method		
cash	56	37.6
meal card	93	62.4

[a] Missing: data omitted by respondent or removed from data pool.

Importance of the Provision of Nutrient Information

Customers were asked to rate the importance of being provided with nutrient information on a scale from 1 (not important) to 7 (extremely important). The mean rating among all respondents was 4.62 (SD 1.80). Table 2 depicts differences in the mean rating based on age, rank, sex, and payment method.

Table 2

Mean Ratings Given to the Importance of Being Provided with Nutrition Information Based on Age, Rank, Sex, and Payment Method[a]

	Importance of provision of nutrient information			
Demographic characteristic	N	Mean	SD	LOS for pair[b]
Age				
< or = 24	63	4.75	1.92	
>24	69	4.47	1.74	
				0.389
Rank				
Officer	14	3.93	1.59	
Enlisted	117	4.68	1.83	
				0.144
Sex				
Female	13	4.67	1.97	
Male	132	4.64	1.80	
				0.962
Payment method[c]				
Mealcard holder	93	4.92	1.84	
Cash payer	56	4.14	1.65	
				0.011[c]

[a] Scale: 1-not important to 7-extremely important

[b] LOS for pair: compared by analysis of variance

[c] Payment method: analysis of variance revealed that cash paying customers rated the importance of being provided with nutrient information significantly lower than meal card holders.

Analysis of variance (ANOVA) revealed no significant differences in the mean rating based on age, rank, or sex, however, cash paying customers rated the importance of nutrient information significantly lower (LOS .011) than meal card holders.

Mean Ratings for the Influence of Taste, Appearance, Calorie Content, Fat Content, Price, and Quality on Meal Selections

Customers were asked to rate the amount of influence that they perceived the factors of taste, appearance, calorie content, fat content, price, and quality had on their meal selections. A scale from 1 (no influence) to 7 (extreme amount of influence) was used to record responses. Table 3 shows the mean ratings for each factor.

Table 3

Mean Ratings for the Influence of Factors Considered When Selecting an Entree[a]

Factor	N	Mean	SD
Taste[b,c]	148	6.49	.87
Appearance[b]	148	5.93	1.17
Calorie Content	148	4.06	1.99
Fat Content	148	4.26	2.02
Price	147	3.80	2.52
Quality[b,c]	147	6.31	1.12

[a] Scale: 1-no influence to 7-extreme amount of influence

[b] Paired samples t-tests revealed that Taste, Appearance, and Quality were rated significantly more influential than Price, Kcal and Fat content (LOS <.000) and

[c] Taste and Quality were rated the most influential of all factors (LOS <.000)

Analysis revealed that customers rated taste, appearance, and quality significantly higher than calorie content, fat content, and price (LOS <.000). Further, the attributes of taste and quality were rated the most influential of all factors considered (LOS <.000).

Differences in the mean ratings of influence for the same factors (taste, appearance, calorie content, fat content, price, and quality) were further examined based on age, rank, sex and payment method. ANOVA was utilized to determine the existence of any differences in the mean ratings between customers aged 24 years or less and those customers aged 25 years or greater (Table 4). The analysis revealed that the 25 year or older segment rated price as significantly more influential on meal selections than did those aged 24 years or less (LOS .001). No other significant differences between age categories were detected.

Table 4

Mean Ratings for the Influence of Factors Considered When Selecting an Entrée Based on Age[a]

	24 years or less (N= 63)		Greater than 25 years (N=69)		
Factor	Mean	SD	Mean	SD	LOS[b]
Taste	6.54	.76	6.41	.98	0.408
Appearance	5.81	1.34	6.01	1.03	0.326
Calorie Content	3.86	2.15	4.32	1.86	0.186
Fat Content	4.14	2.15	4.49	1.96	0.341
Price[c]	3.05	2.49	4.50	2.39	0.001[c]
Quality	6.29	1.13	6.30	1.13	0.949

[a] Scale: 1-no influence to 7-extreme amount of influence

[b] Level of significance (LOS) determined by analysis of variance

[c] Price: Customers aged 25 years or more rated price significantly more influential than those customers aged 24 years or less.

Additional analysis of the data using paired samples t-tests, determined that among those customers aged 24 years or less, the factors of taste, appearance, and quality were rated significantly more influential than price, calorie content, and fat content (LOS < .000). Further, taste and quality were rated as the most influential among all the factors (LOS < .000).

Table 5 shows the results of an ANOVA to determine any differences in the mean ratings based on rank. Results indicated that there were no significant differences in the ratings between the enlisted and officer ranks.

Table 5

Mean Ratings for the Influence of Factors Considered When Selecting an Entrée Based on Rank[a]

	Officers (N= 14)		Enlisted (N=117)		
Factor	Mean	SD	Mean	SD	LOS[b]
Taste	6.49	.88	6.45	.91	0.974
Appearance	5.85	.99	5.88	1.23	0.923
Calorie Content	3.62	2.10	4.15	1.99	0.359
Fat Content	4.15	2.51	4.34	2.01	0.755
Price	4.54	1.71	3.63	2.55	0.212
Quality	6.15	1.21	6.29	1.13	0.678

[a] Scale: 1-no influence to 7-extreme amount of influence

[b] Level of significance (LOS) determined by analysis of variance

There were no significant differences determined in the mean ratings between officers and enlisted

As depicted by Table 6, below, ANOVA revealed that there were no significant differences in the mean rating scores between males and females.

Table 6

Mean Ratings for the Influence of Factors Considered When Selecting an Entrée Based on Sex[a]

	Females (N= 13)		Males (N=132)		
Factor	Mean	SD	Mean	SD	LOS[b]
Taste	6.69	.85	6.46	.88	0.360
Appearance	6.23	1.09	5.90	1.18	0.336
Calorie Content	4.46	2.18	4.04	1.96	0.464
Fat Content	4.62	2.26	4.24	2.00	0.529
Price	2.92	2.47	3.88	2.50	0.204
Quality	6.38	.77	6.31	1.14	0.813

[a] Scale: 1-no influence to 7-extreme amount of influence

[b] Level of significance (LOS) determined by analysis of variance

There were no significant differences determined in the mean ratings between females and males

ANOVA was used to determine if any differences in the mean ratings existed between cash paying customers and meal card holders. As Table 7 depicts, cash paying customers rated price as more influential than meal card holders (LOS <.000).

Table 7

Mean Ratings for the Influence of Factors Considered When Selecting an Entrée Based on Payment Method[a]

	Meal Card holder (N= 93)		Cash Payer (N=56)		
Factor	Mean	SD	Mean	SD	LOS[b]
Taste	6.55	.77	6.40	1.01	0.317
Appearance	5.90	1.19	5.96	1.14	0.762
Calorie Content	4.09	2.07	4.02	1.86	0.842
Fat Content	4.32	2.02	4.16	2.05	0.646
Price[c]	3.21	2.53	4.80	2.19	0.000[c]
Quality	6.35		6.24		0.552
	1.02		1.27		

[a] Scale: 1-no influence to 7-extreme amount of influence

[b] Level of significance (LOS) determined by analysis of variance

[c] Cash paying customers rated price significantly more influential than did meal card holders

Examination of the differences (via paired samples t-tests) in mean ratings among the cash paying customers revealed that taste, appearance, and quality were rated more influential than price, calorie content, and fat content. Results of this analysis are shown in Table 8.

Table 8

Mean Ratings Among Cash Paying Customers for the Influence of Factors Considered When Selecting an Entrée[a]

Factor	N	Mean	SD
Taste[b]	56	6.40	1.01
Appearance[b]	56	5.96	1.14
Calorie Content	56	4.02	1.86
Fat Content	56	4.16	2.05
Price	56	4.80	2.19
Quality[b]	56	6.24	1.27

[a] Scale: 1-no influence to 7-extreme amount of influence

[b] Paired samples t-tests revealed that Taste, Appearance, and Quality were rated significantly more influential than Price, Kcal and Fat content (LOS <.000)

As previously reported in Table 3, the sample of customers rated taste, appearance, and quality significantly more influential to meal selections than calorie content, fat content, and price (LOS <.000). The strong influence of taste, appearance, and quality were also noted among all subgroups of the sample: cash payers, meal card holders, 24 year olds or below, 25 year olds or above, males, females, enlisted, and officers. In each segment, with the exception of females and officers, the factors of taste, appearance, and quality were rated more influential than calorie content, fat content, and price at the <.000 significance level. Although the mean ratings for taste, appearance, and quality among the female and officer segments were much higher than those for calorie content, fat content, and price, the minimum significance level of .002 (as determined by the Bonferroni procedure) was not achieved.

Other Reported Factors of Influence

Respondents were asked to report any other factors that they felt influenced their meal selections in the facility. Responses included: portion sizes, length of the serving lines (short order versus mainline), particular cravings, nutrient density of the food, amount of time available to eat lunch, and appetite.

Discussion

The Most Influential Factors Considered When Selecting Entrees

Many authors have concluded that certain factors such as taste, appearance, value, and quality exert more influence on consumer meal selections, than do health attributes (3-11). The results from our survey, which indicated that taste, and quality were rated significantly more influential than all other factors, supported the findings from these researchers.

Further, it was noted that the factors of taste, appearance, and quality were rated more influential than the health related factors across nearly all sub-segments of the sample. The two exceptions were noted among officers and females. While the ratings for taste, appearance, and quality were much higher than those for the calorie and fat content, the minimum level of significance (.002 by Bonferroni procedure) was not achieved. Had the number of officers (12) and females (13) been greater within the sample, it is likely that significance would have been established among these segments as well.

Among those respondents aged 24 years or less, the factors of taste, appearance, and quality, but not price, were rated significantly more influential to meal selections than calorie content and fat content. Therefore, our first hypothesis was only partially supported. The influence of price may not have received a higher mean rating for several reasons. The first is that approximately one half of this age category held a meal card, in which case, price was of little concern. Second, meal prices at the facility had no "mark-up" as a commercial establishment would have. Therefore, prices may have been perceived as "low" and not of major concern. Lastly, given the young age of this category, there may have been a relative absence of regard for the "value" of money.

It was expected that among those individuals that had to pay cash for their meals, price would be rated the most influential to meal selections. This hypothesis was not supported, as the factors of taste, appearance, and quality received significantly higher ratings than price, calorie content, and fat content. Taste and quality were rated the highest of all factors considered. Given that the age distribution among the cash payers was relatively evenly distributed, the low influence of price, may have been due to underlying perceptions of relatively low meal prices. Although price did not receive the highest rating among cash payers, it would seem logical that cash-paying customers would rate price as more influential than meal card holders, and this was found to be the case.

The importance of being provided with nutrition information was given a mean rating of 4.62 (SD 1.8), which was slightly above a neutral (4.0) rating. This may suggest that although the responding customers apparently were not influenced by the posted nutrient information, they perhaps, would still like to have it available. It was also noted

that cash paying customers rated the importance of being provided with nutrition information significantly lower than meal card holders. This finding is puzzling and does not harbor a clear explanation. Perhaps the meal card holders felt liberated to choose any foods they wanted (given that price was of no consequence) and therefore, were more inclined to want to examine the nutrient composition of the foods being selected.

Other Factors Reported to Influence Meal Selections

On the survey, responding customers were asked to state any additional factors that were perceived to influence meal selections. Responses included: portion sizes, length of the serving lines (short order versus mainline), particular cravings, nutrient density of the food, amount of time available to eat lunch, and appetite.

The factor of time is of particular interest. The possibility that military personnel can often be dismissed for lunch at approximately the same time, could potentially result in bottlenecks within the dining facility. Those personnel who arrive after the "crowd", or who have other matters to address over the lunch period may be inclined to opt for a less healthful, but quickly served, short order grill item, such a cheeseburger, or grilled sandwich, in order to accommodate existing time constraints.

Of additional interest, some personnel reported that portion size was influential to their decision to select an entrée. Those who reported portion size as being influential were also cash paying customers. This finding is similar to that of Casarez et al (7), who also reported that price to value was influential to entrée selection.

Applications/conclusions

The results of this study suggest that among the population studied, nutrition labeling information may have been desirable, however, customers tended not to be influenced by it enough to change their behavior. Further, a nutrition intervention campaign which focuses solely on the health attributes of targeted entrée items may not be the optimal strategy to successfully influence selections of those targeted items. A better approach may be to design a campaign which highlights the attributes of taste and quality or a combination of health and non-health related attributes. For populations who are under time constraints during the meal period, additional consideration might be given to a strategy which emphasizes the speed or convenience with which a targeted item can be served. The findings of this study may be of particular interest to organizations or clinicians who desire to influence the meal habits of certain populations or individuals.

Limitations must be considered when pondering conclusions drawn from this study. First, the study was conducted at only one military dining facility. Results could have differed if an alternative facility had been studied, or if several facilities had been studied.

Findings from this study should only be generalized to other active duty military populations, which would likely share similar demographic composition. Attempting to generalize to the more diverse civilian population, or to a predominantly older population may not be prudent.

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Chapter 6

Summary, Conclusions, and Recommendations for Future Study

Summary

The United States Department of Defense (DOD) incurs significant direct and indirect costs every time that an active duty member is discharged because of a weight related issue (Bureau of Naval Personnel [PERS-60], personal communication, February 14, 1997). The 1995 DOD Survey of Health Related Behaviors showed that between 11.9 and 22.6 percent of the active duty members (stratified for age group) remained overweight or obese. In an attempt to help reduce this figure, efforts have been initiated to educate active duty troops about healthy eating habits.

One such initiative, seen within the Air Force, is a nutrition labeling program called the "Check it Out" program. One emphasis of this campaign is to provide the calorie, fat, and cholesterol information of "healthy" foods, in an attempt to encourage dining customers to increase selections of these items.

The success of such nutrition labeling initiatives within the cafeteria and restaurant setting have studied extensively throughout the civilian setting. Zifferblatt et al. (1980), Cincirpini (1984), Mayer et al. (1987), Mayer (1986), Schmitz and Fielding (1986), Forster-Coul and Gillis (1988), Wagner and Winet (1988), Casarez et al. (1994), and Levin (1996), all were able to demonstrate changes in the selections of targeted food items following implementation of a nutrition labeling initiative. However, Dubbert et al.

(1984), Davis-Chervin (1985), Albright et al. (1990), Green et al. (1993), Holdsworth et al. (1997), and Perlmutter et al. (1997) could show only modest effects on selections of targeted items or none at all, following implementation of similar nutrition labeling protocols.

Additional work has focused on the study of other factors besides nutritional composition which may influence meal selection decisions. Research conducted by Dalton et al. (1986), Colby et al. (1987), Granzin and Bahn (1988), Albright et al. (1990), Green et al. (1993), Casarez et al. (1994), Fitzpatrick et al. (1997), Perlmutter and Gregoire (1997), and Glanz et al. (1998) suggest that other factors such as taste, appearance, quality, value, and price may be even more influential to meal selections than nutrition related attributes.

No objective data exist regarding the effectiveness of nutrition labeling protocols within a military population, and specifically, no objective data exists regarding the effectiveness of the "Check it Out" program in influencing sales of targeted items. Therefore, the purpose of this study was to investigate the influence of a point-of-choice nutrition labeling program (The "Check it Out" program) on entrée selections and to determine the extent of influence that certain factors such as taste, appearance, price, calorie content, fat content, and quality are perceived to have on entrée selections among active duty military members frequenting a base dining facility. Specific objectives of this research were to:

- Quantify the extent of influence that taste, appearance, calorie and fat content, price, and quality have on entrée selections among active duty military personnel in a military dining facility.

- Observe the influence of a point-of-choice nutrition information protocol (the "Check it Out" program) on selections of entrée items with less than 15 grams of fat and less than 100 milligrams of cholesterol.
- Determine other factors which may influence military personnel entrée selections.

Methodology

Research Site

The Fort Riley, Kansas, Main Post Dining Facility was the research site chosen for this study. The dining facility utilizes an a la carte-system and has three service areas: a hot food line, salad bar, and a short-order line. The facility serves breakfast, lunch, and dinner seven days a week. A midnight breakfast meal is served from 2330 to 0030. There are approximately 300 meals served during lunch with a range between 200 and 400. All active duty military personnel assigned to Fort Riley Army Base are eligible to dine at this facility. Active duty members comprise, by far, the largest percentage of the customers.

Research Design

A Quasi-experimental design was utilized to compare sales of targeted items between a 12 month historical baseline period and two 30 day post-intervention periods. The intervention materials consisted of posters, 3 by 5 inch laminated nutrient display cards, promotional refrigerator magnets, and one-page flyers explaining the program.

The flyers and magnets were available for a one week period and were followed up by the placement of the posters and nutrient display cards throughout the appropriate areas of the serving mall. These latter intervention materials were in place for a one week period prior to recording the first 30 day post-intervention sales period. Thirty days later, a second 30 day post-intervention sales period was recorded to check if any changes in sales were sustained. All promotional materials remained in place for the duration of the study period.

Attitude Questionnaire

A brief, one page, one-sided, questionnaire designed to collect demographic data about the customers and to obtain insight into factors influencing their meal selection decisions was distributed by facility staff. Demographic data included: age, sex, rank, length of time the respondent had utilized the facility for the lunch meal, and whether or not the respondent was presently on the weight management program. Other information collected included: whether or not the "Check it Out" materials were visible, whether or not the materials influenced entrée selections, whether or not the materials caused a change in attitudes about nutrition, and the influence of certain factors such as appearance, taste, price, caloric and fat content, and quality on meal selection decisions.

Entrée Analysis

A total of 54 entrée recipes were analyzed using Nutritionist IV (version 3.5) diet analysis module (N-Squared Computing, First Data Bank Division) and from nutrient data provided by the manufacturer's packaging label.). There were 18 entrees that met

the "Check it Out" criteria (<100 milligrams of cholesterol and < 15 grams of fat). Four entrees were deleted from the study due to insufficient sales of the item. Seven entrees with nutritionally similar content were combined (i.e., sales of baked fish and baked fish portions were recorded under the single recipe title of baked fish). Sales data for a final total of 43 entrees were recorded and analyzed for this study. The nutritional analysis of all entrees was conducted by the researcher, who is a registered dietitian. For this study no recipes were modified from baseline formulations.

Results

A total of 149 questionnaires were obtained during the lunchtime meal by convenience sampling. Males comprised nearly 90% of the sample. Close to half (42.3%) of the responding customers were age 24 years or less and one-fourth (25.5%) of the customers were between the ages of 25 and 31. Over three-quarters (78.5%) of the customers were enlisted while only a small percentage (9.4%) were officers. Nearly 40% of the respondents reported utilizing the facility at lunchtime for a period of ten months or more, while another one-third (32.2%) reported that they had been eating at the facility for 3 months or less. Approximately 60% of the customers paid for their meals with a government meal card, while the others reported paying cash. Only two customers reported that they were on the weight management program, therefore, no statistical tests were conducted on this demographic characteristic.

Customer Reaction to the "Check it Out" Materials

Approximately 60% of the respondents reported that they had noticed (unaided recall) the CIO materials throughout the dining facility. The majority (79.2%) of the responding customers indicated that the presence of these materials did not influence their meal selection decisions. The majority (75.2%) of the customers also reported that the materials did not influence their attitude about nutrition for the better. Chi-square analysis of the frequencies revealed no significant differences in reactions to the "Check it Out" materials based on age, rank, or sex.

Importance of the Provision of Nutrition Information

Customers were asked to rate the importance of being provided with nutrient information on a scale from 1 (not important) to 7 (extremely important). The mean rating among all respondents was 4.62 (SD 1.80). Analysis of variance (ANOVA) revealed no significant differences in the mean rating based on age, rank, or sex, however, cash paying customers rated the importance of nutrient information significantly lower (LOS .011) than meal card holders.

Influence of Taste, Appearance, Calorie Content, Fat Content, Price and Quality on Meal Selection Decisions

Customers were asked to rate the degree of influence that they perceived the factors of taste, appearance, calorie content, fat content, price, and quality had on their meal selections. A scale from 1 (no influence) to 7 (extreme amount of influence) was

used to record responses. Analysis revealed that customers rated taste, appearance, and quality significantly higher than calorie content, fat content, and price (LOS <.000). Further, the attributes of taste and quality were rated the most influential of all factors considered (LOS <.000).

The strong influence of taste, appearance, and quality were noted among all subgroups of the sample: cash payers, meal card holders, 24 year olds or below, 25 year olds or above, males, females, enlisted, and officers. In each segment, with the exception of females and officers, paired samples t-tests revealed that the factors of taste, appearance, and quality were rated more influential than calorie content, fat content, and price at the <.000 significance level. Although the mean ratings for taste, appearance, and quality among the female and officer segments were much higher than those for calorie content, fat content, and price, the minimum significance level of .002 (as determined by the Bonferroni procedure) was not achieved.

Analysis of variance was used to detect differences in ratings based on age, rank, sex, and payment method. The analysis revealed that the 25 year or older segment rated price as significantly more influential on meal selections than did those aged 24 years or less (LOS .001). No other significant differences between age categories were detected. ANOVA determined that there were no significant differences in the ratings between the enlisted and officer ranks, or between males and females. However, it was determined that cash paying customers rated the influence of price significantly higher than did meal card holders.

Other Influential Factors

On the survey, responding customers were asked to state any additional factors that were perceived to influence meal selections. Responses included: portion sizes, length of the serving lines (short order versus mainline), particular cravings, nutrient density of the food, amount of time available to eat lunch, and appetite.

Sales Data

Analysis of Variance determined that there were no significant differences in sales of targeted entrees between the historical and post-intervention periods. Nor were there any differences in the proportion of targeted entree to total entrée sales between the three periods. A final ANOVA was conducted on the natural log of the proportion data in the event that it was not normally distributed. The final test revealed no significant differences between the periods.

Conclusions

Effectiveness of the "Check it Out" Program

The results indicated that the presence of the "Check it Out" (CIO) materials and displays had no subsequent impact on sales of targeted items among the population studied. These findings are similar to those reported by Green et al, 1993, Holdsworth et al, 1997, and Perlmutter et al, 1997, who also determined that a nutrition labeling protocol had no impact on sales of targeted items. Additionally, only one-fifth of the sample reported that the materials had influenced their selections or had changed their

attitude about nutrition. However, even though the nutrition information did not influence sales of targeted items, respondents indicated that they still prefer to have the information available.

Factors Influencing Meal Selections

Survey data revealed that the factors of taste, quality, and appearance were rated significantly more influential to meal selections than those of price, calorie content, and fat content. This information supports the findings of Dalton et al. (1986), Colby et al. (1987), Granzin and Bahn (1988), Albright et al. (1990), Green et al. (1993), Casarez et al. (1994), Fitzpatrick et al. (1997), Perlmutter and Gregoire (1997), and Glanz et al. (1998) who also determined that the factors of taste, appearance, and quality tended to be more influential to meal selections than did health attributes.

Hunt et al. (1997) and data from a Survey conducted by the National Restaurant Association (Attitudes toward nutrition in restaurants: assessing the market, 1990) suggested that younger aged males would be the least concerned with nutrition related issues. The results of our study tend to support this conclusion.

Recommendation

Based on the results of this study and the work of others, it appears that a marketing campaign which emphasizes the attributes of taste, quality, and or appearance might be more effective in encouraging selections of targeted food items than one which emphasizes health attributes. Additionally, for healthful items served on the short order line, marketing emphasis might be placed on time and convenience.

Limitations

The results of this study are based on a single military cafeteria. Additionally the sample included a high concentration of young (24 years or less) males. Therefore, generalizations should be cautious, and perhaps even limited to those military populations which would likely share similar demographic composition. However, the findings of this study may still be of benefit to organizations or clinicians within the civilian sector who desire to influence meal selections among a similar population.

Future Research

Given the abundance of data which suggests that health-related factors do not rate as influential to meal selections as do those of a sensory nature, it may be wise to conduct research to see if a marketing approach which emphasizes the non-health related attributes of targeted food items can consistently result in increased selections of those items.

Additional research might be directed at age differences in regards to factors which influence meal selections. It may be hypothesized that older individuals, particularly those who may suffer certain health problems, would be more influenced by the health attributes of foods than their younger counterparts.

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APPENDICES

Appendix A

Customer Survey

Customer Survey

Age (circle)	Rank (circle)	Sex (circle)	Are you presently enrolled in the weight management program? (circle)	How long have you been eating lunch at this facility? (circle)
≤24	E6 or below	male	yes	< 3 months
25-31	E7-E9	female	no	4-6 months
32-38	01-03			7-9 months
>38	04 or above			10 months or more
	Other			

1. Did you notice the **"Check it Out"** displays? (circle) Yes No

2. Did the **"Check it Out"** materials influence your meal selections? (circle) Yes No

3. Have the **"Check it Out"** materials changed your attitude about nutrition for the better? Yes No

4. During lunch, do you pay cash or have a meal card? (circle) cash card

5. How important is it to you, to be provided with nutrition information regarding the foods you select in this facility? (circle) 1= not important 7= extremely important

1 2 3 4 5 6 7

6. When making your lunch selections, how influential are the following factors? (circle)
1= no influence 7= has an extreme amount of influence

Taste:	1	2	3	4	5	6	7
Appearance:	1	2	3	4	5	6	7
Calorie content:	1	2	3	4	5	6	7
Fat content:	1	2	3	4	5	6	7
Price:	1	2	3	4	5	6	7
Quality: (aroma, temperature, texture)	1	2	3	4	5	6	7

7. Are there any other factors, not listed here, that influence your meal selections?

_____

_____

Please detach the consent form and give both completed documents to a staff member or place in the appropriate collection boxes by the tray accumulator. Thank You.

Appendix B

Informed Consent Statement

Informed Consent Statement

(A) Subject Orientation

To help us provide you with better service, you are being asked to complete a short, one-page survey regarding factors that influence your meal selections at this facility. Your participation is completely voluntary, and your responses will remain anonymous at all times. The survey will take approximately 3-4 minutes to complete. Please answer honestly. The feedback we receive from you will be used to design future menus and nutrition awareness programs. Thank You for your participation.

(B) Informed Consent Statement

I have read the foregoing subject orientation and agree to participate in the research study.

My participation in this study is purely voluntary. I understand that my refusal to participate will involve no penalty or loss of benefits to which I am otherwise entitled and that I may discontinue participation at any time without penalty or loss of benefits to which I am otherwise entitled.

If I have questions about the rationale or method of the study, I understand that I may contact Capt Allen Sproul, 152 Justin Hall, Kansas State University, Manhattan, KS 66505, at (785) 532-2213.

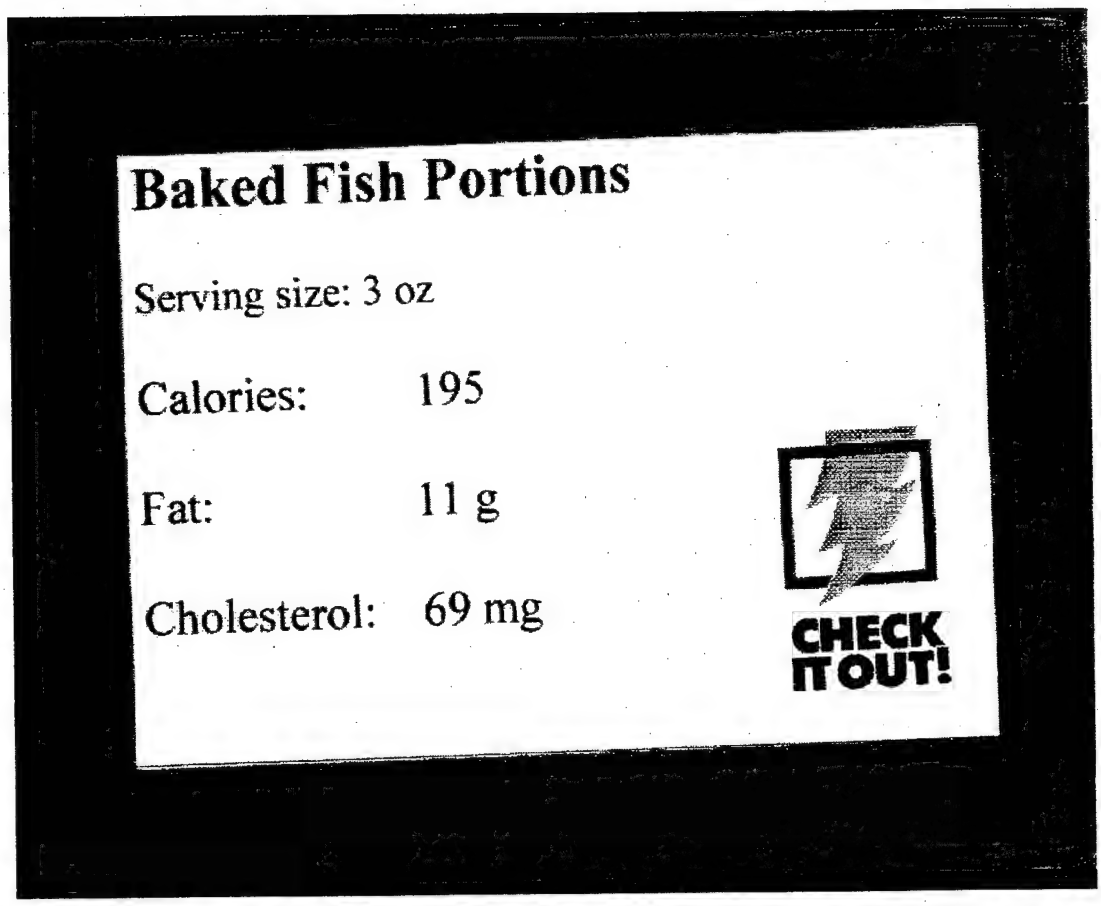
If I have questions about the rights of subjects in this study or about the manner in which the study is conducted, I may contact Clive Fullagar, chair, Committee on Research Involving Human Subjects, 103 Fairchild Hall, Kansas State University, Manhattan, KS, 66505, at (785) 532-6195.

Signature_____ Date_____

Please detach this form from the survey and give both completed documents to a staff member, or place in the appropriate collection boxes by the tray accumulator. Thank You.

Appendix C

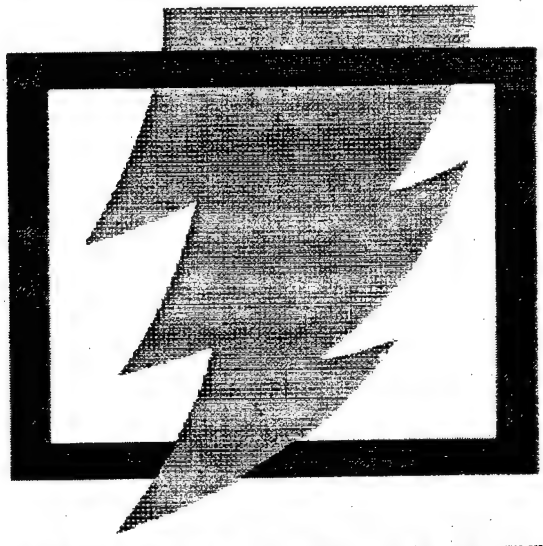
Laminated Nutrient Information Card


Baked Fish Portions
Serving size: 3 oz
Calories: 195
Fat: 11 g
Cholesterol: 69 mg
CHECK IT OUT!

Appendix D

Promotional "Check it Out" Poster

It's a sure sign you're eating better.



CHECK IT OUT!

Appendix E

Explanatory Poster and Flyer

The Check it Out Program

The Check it Out program has been designed to provide the calorie, fat, and cholesterol content of selected entrees within this facility. Those entrees which contain less than 15 grams of fat and 100 milligrams of cholesterol will be labeled with the above symbol. The calorie, fat, and cholesterol content will also be provided.

Entrees which have been designated with the check it out symbol may be considered more "heart friendly" than those entrees which have not received the symbol.

STARTING NEXT WEEK, be sure to look for this symbol on the serving lines and start eating HEALTHY!!!

Appendix F

Refrigerator Magnets


CHECK IT OUT!